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THE MEDICAL SOCIETY AND MATERNAL MORTALITY*

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THE motives which have actuated the presentation, for your thoughtful consideration, of the facts outlined in this essay are inspired by no desire to condone or condemn in this matter either the shortcomings of the medical profession on the one hand or those of the group sometimes called our "innocent victims" on the other. Indeed we are impelled rather by an earnest desire to seek the simple truth, to weigh it without prejudice and to find somewhere in our quest a guiding beacon for our future conduct.

If one were searching merely for a defense of our much-maligned profession in this tragic condition which Paul DeKruif has called "today's saddest medical scandal" he would find it on the lips of the uncounted thousands of women whose hearts are still filled with gratitude for the physicians who led them safely through the perils of motherhood. This, however, is not intended to be an appeal to sentiment or a pleasant excursion into the romance of maternity care. It is our aim, rather, to undertake at the outset an unemotional and dispassionate quest for the truth. Since we seek facts and not fancies our search will be limited to those sources in which the pertinent information, stripped of anathema and alibi, is assembled without fear or favor. The statistics presented in this discussion have been taken, therefore, from reports and studies on Maternal Deaths compiled and published by the Census Bureau and Children's Bureau of the United States Department of Commerce and Labor; from Vital Statistics of Massachusetts published by the Secretary of State; and from "Maternal Mortality" in New York City published by the New York Academy of Medicine Committee on Public Health Relations. These reports were selected because they are impersonal and impartial and the data compiled in all of them are tabulated according to a fairly uniform standard.

Before proceeding with our investigation let us ask ourselves—What is "maternal mortality"? Simply defined it is "death among women from causes directly or indirectly associated with child-bearing." The Bureau of the Census of the United States Department of Commerce, which is charged with the responsibility of compiling vital statistics, follows the "Manual of the International List of Causes of Death" and classifies maternal deaths as we have defined them under the heading, "Deaths in the Puerperal State." "The word puerperal," says the Manual, "is used in the broadest sense to include all affections dependent upon pregnancy, parturition and also diseases of the breast during lactation. . . . The fact that childbearing occurred within a month of death should always be stated even though it may not have been a cause of death." This is the classification required by the National Census Bureau of all state census bureaus which in turn exact adherence to the rule from similar agencies compiling vital statistics in cities and towns. From the data thus obtained, our Mortality Statistics and Mortality Rates are evolved. Under strict interpretation of the rules applying to the puerperal state all deaths due to any cause whatsoever except violence occurring in pregnancy, labor and the first month of convalescence from childbirth must be classified as maternal deaths. It is highly probable that some deaths are classified erroneously as puerperal. Indeed, in a study of "Maternal Deaths" made in fifteen states by the Children's Bureau of the United States Department of Labor in 1933 (Bureau Publication No. 221), 156 deaths in 7,537 were found to have been inaccurately classified as puerperal deaths. This represents one error in every forty-eight classifications—by no means a negligible number.

When the superexpert statisticians of the Census Bureau in Washington fall into error it is obvious that the way of amateur statisticians, like that of other transgressors, is hard indeed. Another source of discrepancy is to be found in the manner in which mortality rates are expressed. For example, the Committee of the New York Academy of Medicine for the study of Maternal Mortality found that birth and death rates were calculated in New York City per 1,000 live births while for the State they were calculated per 1,000 births live and still.

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The National Census Bureau computes mortality rates per 1,000 and per 10,000 live births, the Massachusetts Division of Vital Statistics per 10,000 live births and per 10,000 confinements, while some municipal and other reports fail to indicate whether the rates are computed on the basis of live births or all births. While it is undoubtedly a fact that figures do not lie, it is no exaggeration to say that their careless use often obscures the truth.

Enumeration of the opportunities for error would not be complete without mention of that subtle coup de grâce of officialdom known as "The Standard Certificate of Death" without which no one, no matter how defunct, is entirely and legally dead. To the wily and the wary as well as to the innocent and ingenuous this important and well-meaning document often presents terrors and difficulties when they attempt honestly to determine the Disease Causing Death called the "primary cause" and the Contributory Cause or Causes called "secondary." One may cite as evidence that a dilemma may exist, the following causes of death reported to the Health Department of a large southern city: "Nervousness from gunshot wound. Fractured skull; contributory—mule. Frightened to death by deputy sheriff. Rubbed to death by chiropractor." These, no doubt, are legitimate causes of death but unhappily do not conform to the puritanic orthodoxy of the "Manual of Joint Causes" or "The International Classification." When one pictures the quandary of a conscientious physician facing the sad duty of filling out the death certificate of a patient who succumbed during the puerperium to a combination of chronic cardiorenal disease, placenta previa and puerperal sepsis, is it to be wondered that errors creep into our statistics?

The past decade has witnessed a steadily growing lay literature on the subject of maternal mortality. The interest of the public thus aroused serves a useful purpose which should receive the wholehearted approval of our profession if it does no more than stimulate a desire for more and better prenatal care. When, however, such literature contains erroneous statements or actual falsehoods even though well intended, we should not be expected to submit to the libel in inarticulate indignation. The hue and cry on deaths from sepsis, for example, furnish fine fodder for the propagandist. Why not tell the truth about the part self-induced and criminal abortions play in this mortality? In spite of the laissez-faire in speech practiced by "us moderns" the use of the word abortion outside of the hospital staff room or the criminal court is still greeted with an offended raising of the eyebrows. Yet physicians should know and the public should be told that abortions cause about 4,000 deaths annually in the United States.

Next in odium to downright falsehood is the "half-truth." The lie is the weapon of the weak and in this role the moralist may condone it on occasion. But the half-truth is especially deserving of contempt for it masquerades for what it is not. Statements comparing the mortality rate of the United States with that of certain foreign nations, to our eternal shame and humiliation, are "half-truths." To be sure, the same "International List of the Causes of Death" is followed, but our methods of classification are so much more stringent that deaths called "puerperal" or "maternal" in this country would not be generally so classified abroad. Evidence that this difference in method exists was obtained by the Division of Vital Statistics, Bureau of the Census, Washington, when it sent 1,073 identical copies of selected death certificates to twenty-four foreign countries for assignment of the causes of death. Replies were received from sixteen nations. Less than half of the deaths, 431 of the 1,073, were assigned by all replying countries to a "puerperal" classification. Only one country, Denmark, assigned fewer cases than the United States to the nonpuerperal group. Norway and Sweden, cited by propagandists as shining examples of nations blessed with a low maternal mortality rate classified three times as many cases as nonpuerperal as did our Census Bureau. This seems like fairly convincing proof that in our statistics on maternal mortality we are painting ourselves more black than we really are. Moreover, no amount of legerdemain with figures can show the racial and environmental factors that influence the safety of childbearing in any country.

These facts have not been marshaled for the purpose of lulling you into a sense of tolerant complacency toward existing conditions or to hide from your eyes the stain that our maternal death rate has left upon our national honor. It is the design of this review, rather, to place before you, stripped of the somber cloak of statistics and the camouflage of propaganda, the stark figure of tragedy that casts its sinister shadow upon maternity. That we may the better cope with its insidious encroachment into the right of the parturient to live, let us scrutinize calmly and without hysteria the modus operandi of this monster and then coolly and deliberately consider with what weapons we shall attack it.

Not all deaths in childbearing are preventable. The very notion of death from the purely physiological standpoint precludes that assumption and authorities concede that an inescapable minimal death rate must exist. Moreover, there are certain maternal deaths that we call unavoidable because in the light of our present knowl-

edge we have no certain way to prevent them. With these two groups we are not at present concerned. It is with the deaths reducible in number if not wholly preventable that we are deeply concerned. In order that we may the better appreciate the importance of this group let us consider a few statistics expressed in round numbers. Approximately two and one-half million pregnancies occur annually in the United States. According to Taussig* 681,600 of these are terminated by abortions, 60 per cent of which, in his opinion, are induced. In round numbers about 16,000 maternal deaths occur annually of which abortion is responsible for one fourth. This gives a fair general estimate of the situation throughout the country.

To insure greater accuracy in the conclusions to be reached from a study of maternal mortality statistics, the United States Children's Bureau in 1927 and 1928 made a detailed study of the maternal deaths occurring in fifteen states selected as representing a fair cross section of our general population. Review of statistics was supplemented by personal interviews with the physicians or midwives who attended the fatal cases. A brief summary of the findings is illuminating: A total of 1,176,603 live births were recorded in these states during the years of the study. There were 7,537 maternal deaths, 156 of which were from nonpuerperal causes. The death rate was 64 per 10,000 live births in the states studied as against 67 per 10,000 for the entire birth registration area of the United States. One third of all the deaths occurred before the seventh month of pregnancy and one fourth, 1,825, followed abortion—three fourths of the aborted dying of blood poisoning. As 1,549 or 40 per cent of all the deaths were due to sepsis or blood poisoning it is obvious that abortions contributed heavily to the general maternal death rate. Of the cases dying of sepsis later in pregnancy 65 per cent were spontaneously delivered. Next to infection the heaviest toll was taken by albuminuria and convulsions which accounted for 26 per cent of the deaths, while accidents of pregnancy and labor caused 10 per cent. Some operative procedure preceded death in 50 per cent of the cases but physicians cannot be held entirely blameworthy in all the cases for the poor results obtained, since in 43 per cent of the operative cases the physician had not seen the patient before the emergency requiring the operation had occurred. On the other hand the fact that cesarean section was performed on one fourth of all the patients who died following operations for delivery, may indicate lack of skill, judgment or experience on the part of the attendant and to the responsibility in this which may be placed on the physician should be added the unwise choice of anesthetics which is cited in the report as a contributory factor in some of the deaths. While nationally collected statistics on the role of the relief of pain in labor in the causation of maternal deaths are not available, the report of Montgomery in a recent number of the *Journal of the American Medical Association** tends to support an opinion privately voiced by many that amnesia and analgesia have merely added new horrors to the practice of obstetrics.

The role which the lack of adequate prenatal care played in this mortality is as tragic as it is striking. In but 1 per cent of the cases where prenatal care was sought did it reach a desirable standard. Here, obviously, the blame and the shame are on the medical profession. On the other hand, of the 5,636 women who might have been expected to have had decent prenatal care more than half (54 per cent) had no prenatal examination by a physician. "For the most part," says the report, "physicians had no opportunity to give prenatal care to these women because they were not consulted." It is particularly interesting to note that for one in every eight of the 7,380 cases making up this tragic series no physician was ever in attendance. In round numbers 5,000 women reached the last 3 months of pregnancy, of whom 3,000 were delivered at home and 2,000 in hospitals. Of those hospitalized more than half were admitted as emergencies and only 900 had planned to have hospital care.

Enough of the horrible details. Let us try now to place, if we can, some measure of the responsibility and to seek a remedy. The burden of responsibility for a death in childbearing rests essentially upon three agencies, the patient, the physician and the public. Primarily it is the duty of the pregnant woman to assure herself and her unborn child of every available protection against disaster. The safeguards needed, unhappily, are not always available to her but too often, alas! ignorance prevents her from seeking them or from recognizing them when they are before her. But when she is sufficiently educated and the opportunity for proper care is available and she rejects it through complacency or bad advice and even attempts by her own hand or another's the destruction of the life within her, then the problem becomes more social and moral than medical.

That deaths following abortion play an important role in the causation of maternal deaths was shown by the investigations of the New York Committee. It found that approximately 1 in every 5 maternal deaths in New York City in the years 1930, 1931 and 1932 followed abortion, while the therapeutic abortion, an allegedly benevolent procedure, accounted for 1 in every 7 deaths from this cause.

What of the physician and our death rate? The medical profession, while it deplores, does

*Taussig, F. J.: Abortion, Spontaneous and Induced: Medical and Social Aspects. St. Louis: C. V. Mosby Company, 1936.

*J. A. M. A. 108:1679 (May 14) 1937.

not deny its share in the culpability. There are incompetent physicians as there are incompetent operators of motor vehicles and both take their toll of lives year after year. Often enough the physician is morally if not physically negligent in his care of the parturient patient. Too often he is ignorant of his duties and responsibilities because of lack of knowledge, training and experience. Generally he is conscientious but often handicapped by ineptitude or incompetency. That deadly aphorism, "Childbearing is a perfectly natural process," has filled many a physician with dangerous, unjustified self-assurance. The oft-exploded myths about birth among the ancients and the savages are accorded greater credence than the solemn experiences of thousands of honest physicians who have striven to learn by their own mistakes and those of their forebears. To blame all physicians for the sins of a few is as unjust as to blame the medical profession for the deaths of women who come to it for succor when beyond hope of saving due to their own ignorance, neglect or failure to cooperate or from the crime-stained hands of the abortionists.

The public, too, shares with patient and physician this heavy responsibility in its failure to demand and obtain better facilities for the protection of motherhood, higher standards of qualifications for those who are to be entrusted with its care and a broader scope in the program in health education, to the end that the gross ignorance still so prevalent may be mitigated at least, since it cannot be entirely eradicated. The care of the childbearing woman is a medical problem in all its aspects and when the public delegates any part of that care by authority or by acquiescence to lay or quasi-medical hands without adequate medical supervision it invites the public disaster of a high maternal mortality. Greater cooperation and broader mutual understanding of the common problems of the medical profession and those charged with the expenditure of public funds for medical purposes will go far in providing better physical facilities for maternity care. The modern trend in hospital construction toward greater architectural grandeur and fewer hospital beds is to be deplored.

Although lack of maternity care is not always due to inaccessibility of a physician it has been found more frequently where physicians are not readily available. Even Massachusetts is not exempt from this problem. Ultimately something will be done about it and the Medical Society may well initiate the first steps. Whether we approve of it or not the day is not far distant when subsidization of physicians, especially in small communities, will be no longer a fear but a fact.

Meanwhile what is the medical profession in general and what is the Medical Society in particular doing to improve the unwholesome condition that now pertains in this matter of maternity care? A glance at the record shows that the profession through its various organizations is demanding—first, better obstetric teaching in the medical schools; secondly, more practical training in maternity care for the hospital intern; and, thirdly, standardization of qualifications for specialists in obstetrics to the end that the unfit and the specialist by proclamation, generally his own, be eliminated from the field. In addition to these activities instruction in obstetrics has been provided by the Massachusetts Medical Society through the medium of the postgraduate courses offered to its members during the past 3 years and now conducted for all registered physicians in co-operation with the Massachusetts Department of Public Health under the National Security Act. The Section of Obstetrics and Gynecology still moving under the impetus given to it in 1928 by the present distinguished President of this Society has maintained a continuous program of education in maternity care by means of symposiums before district societies, a column in the *New England Journal of Medicine*, and by studies of maternal deaths in the State from toxemia of pregnancy and puerperal sepsis. Throughout the United States similar activities are being conducted by regional and national societies of obstetricians and gynecologists with the particular aim in view of improving the education and training for maternity practice. In our own New England Obstetrical and Gynecological Society the trained specialist has joined hands with the general practitioner for the better understanding and the happier solution of our common problems.

In spite of what has been done and what is now being attempted, our maternal death rate is far too high. There has been little improvement observable since 1900. Meanwhile what has become of the doctor's horse and buggy and the dim light that burned the night long in his office window to guide the breathless messenger to his door? It is incredible that this span of years that has given us the marvel of the airplane, the wonder of the cinema and the miracle of the human voice encircling the globe can still complacently witness the death of one woman in every one hundred and fifty-five who bears a child, three fourths of whom die of preventable causes.

What are we as one of the oldest organized medical groups in America going to do about it? The problem looms large on the horizon of our medical future. Unless we attempt an early solution, government bureaucracy or paternalism will take the matter out of our hands. What form the remedy will assume is beyond our present clairvoyance. Certain recommenda-

tions appear advisable in the light of experience in the past and hope for the future. First in importance is the education of the public in the need for and the benefit derived from proper maternity care; secondly, the creation of a Maternal Welfare Commission to be composed of representatives of the State Department of Public Health, the Board of Registration in Medicine, the Massachusetts Medical Society and charitable organizations concerned with public welfare, a commission armed with broad supervising authority under the police powers of the Commonwealth especially for the investigation of deaths in the puerperal state; thirdly, the establishment within the Medical Society of an obstetrical consultation service to be available for needy cases that, for good and sufficient reasons, cannot be referred to clinics; and finally, a courageous and determined effort in our own midst to raise the standards of professional conscience as well as those of professional care to the end that the mothers entrusted to our hands, though they "walk through the valley of the shadow of death", will fear no evil.

GEORGE W. GAY LECTURE ON MEDICAL ETHICS*

BY LAWRENCE K. LUNT, M.D.†

THIS lectureship was founded by Dr. George W. Gay, a graduate of this School in the class of 1868 and a public-spirited and revered physician of Boston who died in 1931, at the age of 89. Owing to an appendix abscess and subsequent operations, he was forced to give up his active surgical practice at the age of 53. But he loved his profession and with undiminished vigor of spirit he continued to serve it in legislative matters having to do with public health, in the State Society, and in educating the public along the lines of preventive medicine. He was probably aware of the fact that few medical students have reason to acquaint themselves with the ethical aspects of their profession, and become internes and even practicing physicians without having heard much beyond a few casual references to this side of professional life. He therefore arranged for lectures to be given at Harvard and at Tufts on medical ethics.

Ethics is the consideration and study of right action toward the production of the highest good, and in its practical aspects comes down to what is right, what is good in the relation of one human being to another. The basic principles of ethics apply to all the many varieties of human relations, but each field will have certain distinctive factors peculiar to itself which demand special attention and definition. This is especially true in the relation between the person in trouble and the one to whom he turns for help; and still more intensively so where that trouble is illness. Therefore, it is a natural development that men whose energies are devoted to the problem of illness should consider and formulate principles seeking the highest good in this particular field.

If there were not a considerable number of men seeking to take advantage of their fellows at every turn, such principles would not be necessary. But there always have been and always will be predatory individuals seeking their own nefarious ends at the expense of others. The person whose body or mind is disabled is at a disadvantage and often an easy prey for those who are waiting their chance, and for this reason requires special protection. Therefore, professional men whose genuine desire it is to relieve suffering seek to prevent such abuse and to set down suggestions to that end. Furthermore, as they are human beings working together in the same difficult field, they have relations among themselves of such a nature as to require examination and clear understanding. And, finally, being members of society, there are matters relating to the body politic which demand definition. So evolves medical ethics with its three aspects: the relation of doctor to patient, the relation between doctors themselves and the relation among doctors and the public at large.

Instruction in this subject has been a matter of concern to the teachers and practitioners of the "Healing Art" since the days of Hippocrates, some four hundred years before Christ, and, no doubt, even before that. The medical students of ancient times were novitiates in the temples of Aesculapius and were bound by oaths, and it is said that "when it became necessary to admit outsiders into the hereditary schools of Greek medicine, Hippocrates administered an oath in order to secure candidates of a suitable character." Should you desire information concerning the oath, you could not do better than to read W. H. S. Jones's "The Doctor's Oath," a most interesting study of the various sources and forms of the Hippocratic oath. It has survived to our day, and several variants, obviously based on the same original form, have also come down to us. When the Christian Era dawned, a somewhat modified version was evolved, "the

*Delivered before the medical students of Harvard University, February 9, 1937, under the endowment of Dr. George Washington Gay.

†For record and address of author see "This Week's Issue," page 994.

oath according to Hippocrates in so far as a Christian may swear it." In the Arabic "Lives of Physicians," by one Ibn abi Usaybia, of the thirteenth century, appears the "Text of the Covenant Laid Down by Hippocrates." As given in Jones's book, it is the most impressive rendering of them all. But, whatever its origin and early use, as Jones says, "here we have an early record of those noble rules of conduct, loyal obedience to which has raised the Art of Medicine to the high position it now holds." Though basic human nature does not change, customs and manners do and, whether it is because of this latter fact or because of the increased and therefore unwieldy numbers in the practice of medicine, an oath no longer seems to be the most effective method of transmitting ideals of medical conduct.

To transmit these by oath, then, is out of fashion; and even the milder form of compulsion, a required course, is not apt to serve the purpose. Some say that it cannot be taught in the usual manner of teaching, that it is best learned by infiltration, as it were, by observing one's instructors at work with patients and their colleagues. "Indeed," says Richard Cabot, "if the individual student has a chance to see his teacher 'in action' outside the classroom, he may learn good ethics in one of the most effective ways—by example." He observed that interns, "callow youths, shapeless souls, would be transformed within the eighteen months of their service, not into saints or heroes, but into something quite miraculously better than they were eighteen months earlier."

It is a fair question how effective any kind of direct teaching is going to be. Ray Lyman Wilbur says, "There is no real way of lecturing Medical Ethics into people," and C. D. Leake, writing on how it is to be taught, says: "The average medical student of today is a keen, thoughtful and mature individual, sincere at heart, but well versed in the clever sophistries of the times. Usually sympathetic with the debunking attempts of H. L. Mencken and his literary kin, he will not easily tolerate the traditional senile drivel on Medical Ethics. From such sentimental slop, our medical students have long been weaned." "All the stringent codes devised," writes Frank Smithies, "could not compel man to act ethically, were there not engraved on his heart and in his mind a true balance of right and wrong."

The unthinking layman does not understand what it is all about, and sometimes thinks he is the victim of that honor that is said to be among thieves. They have even proclaimed that it is a subject preached by the older members of the profession but practiced only by the idealistic young. However, it is a perennial subject, and will continue to be. Valedictory addresses to graduating medical classes, if not entirely on the subject of professional ethics, inevitably contain references to this subject. And this is as it should be, because, during his years of study, while trying to absorb vast and complicated details concerning the diseases which he will be expected to cure, the poor medical student has had little time or need for considering the general, more subtle aspects of practice. For this very reason, it is necessary to give him at least the opportunity of hearing more about this subject, and the chance of cultivating the field in order that the seed may grow. Unless his understanding has been awakened, he is not going to profit by the examples, good or bad, set by his instructors. True, in part at least,

> Regulations and Rules
> Are made for Fools.
> The wise don't need 'em,
> The wicked won't heed 'em.

But the wise like to make and hear about them, and perhaps some of the wicked may thereby become just a little less wicked!

Many centuries ago, it was perhaps more possible than now to keep the wicked off the accredited lists of honest physicians, and today this effort is maintained in our best medical schools by their rigorous entrance requirements. When once within their portals, there is no required course on ethics; as coercion is unavailing, the voluntary course or lecture is the more acceptable method of approach. The student should discover that this is to be an important aspect of his professional life; then let him, by his own efforts, learn something of what he can be expected to gain from the application of his own right-mindedness.

Being a subject concerned with principles of action, ethics logically finds expression in a code, a concrete statement as to just how these principles are to be applied. The foundation of all codes since the days of Hippocrates has been laid in his oath. It seems to be accepted that no particular contribution or progress was made in the formation of a code from his time till 1803, when the English physician, Thomas Percival, published his "Medical Ethics" at the request of the physicians and surgeons of the Manchester Infirmary, being, as he says in his preface, activated by "an earnest desire to promote the honor and advancement of the Profession—to frame a general system of Medical Ethics; that the official conduct and mutual intercourse of the Faculty might be regulated by precise and acknowledged principles of urbanity and rectitude." This was so well drawn that it has served as the basis for every code since then.

But before considering the matter of codes, it may be of interest to see what qualities the medical aspirant should have, because he is the one to whom the code applies. From time immemo-

rial, it has been acknowledged that he should be a man of honor and high moral character, moved by a genuine desire to alleviate human suffering.

In the Hippocratic doctrines, we are told, "The Student of Medicine should be gentle by birth, excellent by nature, young in years, of moderate stature and symmetrical limbs, of good understanding and pleasant conversation, sound in judgment when consulted, chaste and courageous, no lover of money, self-controlled when angry, not apt to lose his temper even under severe provocation and not slow of understanding. . . . He should be sympathetic and kind with the sick and a faithful guardian of secrets. . . . He should be patient of insult, because many mad and melancholic persons meet us with such, wherein we should bear with them knowing that such conduct does not proceed from them but is really caused by disease external to their proper nature. . . . He should not walk hastily, for this is a sign of levity, nor slowly, for this indicates faint-heartedness." And in all modern writing on this particular phase we find elaborations of this same theme: "There is no profession from the members of which greater purity of character and a higher standard of moral excellence are required than the medical; and to attain such eminence is a duty every physician owes alike to his profession and to his patients." ("Principles of Medical Ethics," American Medical Association.)

We also find exhortations as to the personal behavior of the physician. A twelfth century physician in dietary admonitions to his son writes: "Be content with little and good and beware of hurtful sweets. Eat no eating that prevents thee from eating. Art thou not ashamed before thyself and the world when all know that thou art periodically sick because of thy injurious diet? There is no more disgraceful object than a sick physician. Who shall, forsooth, mend others, when he cannot mend himself?" Dr. David Hosack said in 1826: "The physician cannot, consistently with the obligations of duty and regard to his professional character and usefulness, habitually spend his time in the ordinary and frivolous pleasures of life. . . . I trust I shall not be accused of the want of liberality on this subject, but I must be permitted to remark, as the result of long observation, that the habitual indulgence and loss of time expended at the gaming table, the racecourse, the tavern, the political cabal, are altogether incompatible with the occupation, and, I will say, the dignity of character appertaining to the accomplished physician."

And forty years later, the Rev. Henry H. Tucker warned the graduating class of the Medical College of Georgia as follows: "As for the physician who is greatly given to amusements, who must finish his game of cards or of chess before he can respond to the call of a patient, who is an habitual frequenter of theatres or similar places, or who spends much of his time gun in hand, indulging in the sports of the field, I need not say that he can anticipate nothing but miserable failure. . . . Still less need I say that the physician who is given to habits of dissipation, who approaches the bedside with nervous trembling or mind beclouded by the influence of strong drink, cannot succeed, and ought not to. If there is a man on earth who above any other ought to be sober and always clearheaded and cool, it is the man who holds the lives of his fellow men in his hands."

And, lastly, only two years ago, Dr. Robert Osgood in this series of lectures warned that "a breath may have the force of a gale and capsize the boat," a not untimely aphorism in these days when such a premium is placed on quick action that small glasses with potent content are freely and widely used on an empty stomach. Not that we need to be teetotal, but—a word to the wise!

In 1846, the need was felt in this country for the profession to establish a working organization to maintain and improve the standards of medicine. This resulted in the American Medical Association and the promulgation, a year later, of the code, which is now known as the "Principles of Medical Ethics." There has been so much talk of codes, in the past few years, for regulating conduct in other fields of human activity that, when we of the medical profession remember that our code goes back some twenty-three hundred years, we cannot help but feel a sweet tinge of superiority!

But all has not gone smoothly with our code. After its adoption, there were bitter wranglings. The medical society of one great state rebelled, adopted an abbreviated code and, for a time, was not allowed representation in the national association. Friendships were strained, many articles were written, and no doubt many uncomplimentary and perhaps unethical things were said in the discussion of ethics, reminding one of the analogous warfare that bursts out in associations formed to promote peace and goodwill among men. Nor is everyone satisfied with the code today. By one, it is considered cold and unstimulating, like a constitution and bylaws setting forth certain facts and rules, but without inspiration. Another says the code is dying, and yet another insists that it is dead!

The truth of the matter is that doctors are human, and, although we aim at perfection, we are bound to fall short. Dr. M. I. Leff, writing two years ago on "Common Sense About Medical Ethics," in *Southwestern Medicine*, comes to grips with the situation in courageous and no uncertain terms: "Our ethical concepts and spiritual values have been subjected to a thorough-going revision and a sweeping reval-

uation by the same scientific method by which more material problems are solved. . . . " I might inject here certain comments on our present civilization by Herbert Agar in his "Land of the Free": "In this period, the perilous balance between faith and critical thought breaks down. . . . This is the time when man learns to do so many striking things that his brain is warped with his own grandeur and he makes the mistake of thinking he understands the forces he is using. . . . The crowning work of man's criticism, having discredited the thought and religion of the past, is to discredit the mind that criticizes. . . . The new faith in reason has proved a fraud under the self-slaughtering honesty of the same mind."

But, to return to Leff, contrasting the modern doctor with the ancient priest-doctor, he says: "We still retain a feeling that in some way we are different from the rest of humanity. Accordingly, we still do lip service to a code of ethics which came down to us from the good old days when medicine men really were different." The code, he agrees, is admirable but requires a "moral giant" if its "sublime principles" are to be lived up to. It is his observation that hospital internship is disillusioning and "makes cynics of young doctors," and, "retaining the bombastic code, supplies effective ammunition to the charlatans, encourages the exploitation of the profession, and at the same time increases the public distrust in us, and makes us look ridiculous in the eyes of thoughtful people." He points out that men take up medicine not as a calling, not truly having as a prime object the service it can render to humanity, but as a career, as a means of making a living. "Let us then be done with sham, and place our Code in the Museum where it belongs. . . . Let the priest be 'pure, modest, patient' and so forth, and let us be 'upright men instructed in the art of healing'." Leff would put away the old code and raise a new one with all that is good in the old, but notifying the public that the sick are a charge on society in general and not on the doctor in particular, and that the doctor is willing to do his share but should not be expected to carry such a hopelessly large part of the burden as is generally assigned him.

This is one of the frankest and most outspoken recent expressions concerning ethics in the profession, and is an example of the sporadic explosions that have taken place from time to time in the past hundreds, if not thousands, of years, as evidence of unsatisfactory conditions. But I do not believe that Leff is an advocate of "socialized medicine."

I cannot agree that all young doctors, from their hospital experiences and in later contacts with older physicians, are made cynics, because by no means all doctors are cynics; nor is it true that it takes "moral giants" to live up to the code, as there are a considerable number in the profession, both among the outstanding and among those whose fame will never be sung, who go their modest and upright way naturally and in line with the finest principles. But there is enough truth in the proposition that the code is not sufficiently effective to warrant some degree of pessimism; whether more than the usual pessimism that comes from emphasizing the sordid side of human nature, is an open question.

In any event, it is pertinent to bring this matter of controversy to your attention, so you may realize that it is not a subject for idle philosophic speculation, but a vital matter which will enter deeply into your daily lives, and will call at times on your best judgment and efforts not only in organized ranks but in individual endeavor.

The relation of the physician to the public at large has changed in some respects since the comparatively recent advent of departments of health as governmental agencies. These have relieved physicians of many burdens by putting at their command facilities otherwise out of reach; and they aid effectively in spreading useful information and in combating disease. It is unnecessary to say that, when wisely administered, these agencies deserve the full support and co-operation of everyone in the profession. But there is still plenty of opportunity to serve on local boards of health, especially in smaller communities. The physician's interest should not stop with matters of health, however; he should be interested in the general welfare of his community in so far as his time will allow, though, obviously, not to the point of neglecting his patients; and there is apt to be some time that can be spent interestingly, and with profit to all concerned, in purely civic activities.

The most extensive aspect of medical ethics has to do with the relation between doctor and patient, as this concerns the largest part of our professional activities. You may read for yourselves, in the "Principles of Medical Ethics" of the American Medical Association, certain essential details as to what may be expected from the doctor by his patient, but there are other general features worthy of our present consideration.

How often, I wonder, has it been said that we live in days of momentous change? Certainly times without number, as every generation becomes aware that great things are abroad, that "times are changing," and whenever one wakes up to this phenomenon it is at the precise moment when it seems that greater and more relentless changes are taking place than ever before. One of the definite changes that we are forced to recognize and that must enlist our serious consideration is the rapidly increasing centralization of power in the Federal Gov-

ernment. How, if it continues, is it likely to affect our professional lives? We hear ominous rumblings about "state medicine," and just what that is going to be is hard to tell, but how our voluntary ethical code might be affected by codes passed by state legislatures or Congress is not hard to say. From what we hear of such things in other countries, it would seem that law-making bodies are less well equipped to legislate regarding medical care than they are in any other matters, and it is to be sincerely hoped that we shall be spared interference from this direction. However, we already have old age compensation and unemployment insurance in the Social Security Act and the fight is on for compulsory health insurance. Social security has its beneficent aspects, but compulsory health insurance can result only in wholesale abuse, and the inevitable lowering of medical standards, with a consequent deplorable lessening of wholesome ethical restraints.

A change that we are witnessing actually within the practice of medicine is what seems to be the disappearance of the family doctor. It is hoped that this excellent and time-honored gentleman will never pass from the scene, and perhaps he will not, because he must survive in the less densely populated district; and possibly, in a slightly different guise, he will weather the unfriendly atmosphere of the city and carry on his invaluable work in much the same old way, to continue as the exemplar of all that is best in the doctor-patient relation, for he fulfills a deep need in the minds and hearts of sick men. In the cities it is difficult for him to survive, but perhaps they will dwindle to saner, smaller communities, where the family doctor can again be an outstanding figure. It is true that, in some instances, the patient is getting better scientific treatment, and more lives are being saved, but the doctor-patient relation suffers deeply. In the meantime, it all the more behooves the specialist and modern general practitioner to remember the precepts that have come down to us through the ages, and thus to maintain the old enduring attitudes and ideals.

The rapid increase of medical knowledge has necessarily forced the development of specialties, and today we get only faint repercussions of yesterday's complaints against specialization in medicine, for natural growth has made specialties a necessary and permanent part of its structure. Better understanding of disease, new methods of diagnosis, and more effective treatment demand that every patient be given the opportunities that these changes have made possible. But the specialist is usually not qualified to take the place of the general practitioner, and we should continue to have the latter in charge of the case, always alive to conditions wherein his patient will benefit by special diagnosis and treatment. One attempt to meet this change is the medical group, but unless it is composed of men of high motives it may work to the disadvantage, rather than the advantage, of the patient. The great increase in the industries has given rise to the industrial doctor and to contract practice. Both of these have come under scrutiny, and it is agreed that they can be entirely ethical if the doctors working along these lines are properly constituted.

The question of charges for services performed is often among the most difficult ones in the relation between doctor and patient. It has been said that only those at the extremes of financial condition—the poor and the rich—get adequate medical care. This is not entirely true, as there is a large class of reasonably well-to-do people who *can* take care of all legitimate expenses but, who, because it is more enjoyable to pay for pleasant than for unpleasant things, and because sickness is feared and resented, will not face the fact that the inevitable times of illness, coming to nearly everyone, *must* and *should* be paid for. The problem lies among the great number whose incomes are not sufficiently above their living expenses to allow for the full cost of these inevitable times of illness. In the main, doctors have always contributed, and will continue to contribute, their share of services to this group; and they will probably not suffer thereby beyond the point of endurance. It has been stated that during the years of the depression doctors in this country gave, as free services to the public, an amount, estimated from minimum fees, of one million dollars a day. It is impossible to estimate how much of our services are given at other times. Notwithstanding sentimental sociologists, amateur and otherwise, and politicians looking for bigger and better pork barrels, the population gets extraordinarily good medical attention. If some means could be devised whereby all of our financial worries would be lightened and, at the same time, the patient would be properly looked after, everyone would be pleased—the millennium would have arrived! Perhaps we had best form a union, adopt minimum hours of work, say thirty hours a week, and have our fees raised to insure the enjoyment of our idleness!

From the point of view of medicine as a science and as an ideal of relieving suffering, it would simplify matters and make them considerably pleasanter if money did not enter into the picture in any way whatsoever. Perhaps that is one of the reasons why the life of the medical missionary or of the full-time hospital appointee is so appealing. However, as Leff points out, practically all of us approach medicine with the absolute necessity of making a living, no matter how strong or pure the ideal motivation. We expect naturally to continue our own lives, and to take on the personal responsibility for the lives of others in the per-

sons of a wife and children. And, although one may be willing to sacrifice his own comfort and welfare, he cannot demand that others suffer as the result of his asceticism. Furthermore, a man's best work is not going to be done under harsh and neglectful conditions of living. A physician, because of the demands upon him, must so live that his best strength and judgment shall be, so far as possible, always ready. And he must have, and be able to maintain, for himself and his family, standards of living suitable to the environment in which he works. He cannot fail to lose efficiency and the respect of the community if he falls below that standard. Furthermore, the doctor has something that people need and want, and it has cost him much time and effort, and him or his family a considerable sum, to acquire that something; so it is right that, in addition to the satisfaction he gets from hard and conscientious work, he should receive appropriate remuneration for his services. Most laymen take this for granted. For the doctor to be paid for his work does not lower the value or the dignity of medical practice; rather, it may be a source of deep satisfaction that our living is made by trying to relieve suffering.

Just how much to charge is no easy matter to decide. A fairly satisfactory basis to go on is to have a maximum fee based on the time spent, or the operation performed, or whatever unit of calculation is appropriate to the particular type of one's practice, and then scale it down, without bargaining, in accordance with the patient's financial condition, knowledge of which can be gained by open and frank questioning. Inevitably some patients will be dishonest, but in the long run what is lost from them in just fees will not be so great as the damage to one's character in trying to get the full pound of flesh.

The original code of the American Medical Association set forth not only the duties of doctor to patient but also those of patient to doctor. The first duty was a proper consideration on the part of the patient for the person—namely, the doctor—who was making so much sacrifice for him; next, he was enjoined to select a medical adviser with a regular professional education and one "not devoted to company, pleasure, or to any pursuit incompatible with his professional obligations." The patient, especially of the female sex, was exhorted to "faithfully and unreservedly communicate," matters concerning his or her disease, but should never "weary the physician with a tedious detail of events or matters not appertaining to his disease." "He should never permit his own crude opinions" to influence his obedient attention to the physician's prescription. "When practicable," the doctor is to be sent for in the morning, "before his usual hour of going out, and he should not be called unnecessarily during the hours devoted to meals or sleep." The patient is warned against irregular practitioners and the advice of laymen, lest dire results ensue; finally, the code presumes to exhort in the following words: "A patient should, after his recovery, entertain a just and enduring sense of the value of the services rendered him by his physician; for these are of such a character that no mere pecuniary acknowledgment can repay or cancel them." And this was less than one hundred years ago! It is perhaps needless to say that, however much we should like to have our patients govern themselves toward us in this manner, this section of the old code has not survived.

The prayer, attributed by some to the twelfth century Egyptian physician, Maimonides, expresses some of the same sentiments, but in the more appropriate and perhaps more effective form of asking divine influence: "Grant that the sick have confidence in me and my art, and that they heed my advice and orderings. Banish from their side all quacks and the host of counseling kindred, and of overwise nurses, for these are a cruel people and pervert the best intentions and thwart those who are expert in the healing art, and they lead men to death."

The majority of human beings make pretty satisfactory patients and do not require to be told how to treat their doctors. But others will try the soul and bring one to despair. The doctor no longer holds the exalted position in the public eye that once was his. An ingenuous physician who became a state senator complains: "There is not the respect paid to the physician that there used to be. I have been amazed to find how much farther the title Senator goes than does the title Doctor." Though we may have made no claims whatsoever, or pretended to the slightest degree of certainty concerning treatment, we may be condemned, both by the patient and his "host of counseling kindred," for not working miracles. We must learn early that no matter how exemplary our behavior, or skilful and conscientious our attentions, we, as everyone else, will come in for our share of criticism. Indeed, there are some who seem to delight, and even to specialize, in criticism of doctors; in all but flagrant violations of the truth, we might as well accept it gracefully.

It is by no means always the patient alone who is sick; often the family as well is disturbed to the verge of illness. This is natural enough, for illness can be a most disrupting explosion in the household peace, and the doctor is called upon "to keep my head when all about me are losing theirs and blaming it on me." Especially is this true in the case of mental disorders, largely because of the still too widespread prejudice and misunderstanding in relation to them. The puzzled and obstructive attitudes of family and patient can be vastly

Vol. 2
1937

helped by the physician's recalling his ethical principles relating to his colleagues, and, even though skeptical, he can refrain from the "piteous exclamation of Sorrow" or such suggestions as I have actually known certain excellent doctors to make—that to seek psychiatric advice is a "confession of weakness," or results in a "social stigma." But progress is being made against this prejudice. Medical schools are gradually giving more and better instruction on the mental disorders, general hospitals have clinics in the outpatient departments and are developing psychiatric services, as at the Massachusetts General Hospital; and we see medical interns at the Peter Bent Brigham Hospital spending a part of their service at a mental hospital. Surely, all this will result in a better understanding among medical men.

Another point to impress deeply on one's mind and to remember always—again, especially in the case of the emotionally disturbed patient and his family—is that emotional states distort judgment and memory, and statements made by these persons as to what outrageous things other doctors have said as opinion or advice, what they have prescribed, and even what they are supposed to have done, must be weighed carefully and judiciously. A dramatic account of a consultation or visit may present an uncompromisingly black picture of the doctor, and, unless one keeps an objective attitude, one may all too easily commit oneself to a false position and open oneself to just criticism. Such situations are surprisingly frequent, arising not so much from malicious intent as from misinterpretations and hasty judgments made on insufficient evidence. Not that we should lean over backward and pretend that doctors can do no wrong, because, as we all know, there are unwise and unscrupulous men in the medical, as in every other, profession; but we must be sure of our evidence before arriving at conclusions.

The last division of medical ethics, that having to do with the relation among physicians, is to a large extent involved with the aspect dealing with the welfare of the patient; for mutual co-operation, respect and confidence among doctors will help to produce a desirable attitude in the sick person. Said Samuel Bard, in 1769, in his "Discourse on the Duties of a Physician" with "Advice to those Gentlemen who then received the first medical degrees conferred by King's College" (later Columbia University): "On no Pretence whatever, practice those little Arts of Cunning and Dissimulation, which, to the Scandal of the Profession, have been too frequent amongst us. Nor ever attempt to raise your Fame on the Ruins of another's reputation; and remember that you ought not only to be cautious of your words, a Shrug or a Whisper, the stare of Surprise, or a piteous Exclamation of Sorrow, more effectively wound another's Reputation, and more clearly betray the Baseness of a Man's own Heart, than the loudest Expressions"—and, we might add, do no end of harm to the patient by confusing him and often causing him to lose confidence and hope.

If Ray Lyman Wilbur's exhortation could only be followed, that "medical men must view each other as friends not as rivals. They must think of each other as devoted to a common cause and under common handicaps," the Golden Rule in its perfection would be with us. The right-minded, thoughtful man is naturally going to have little difficulty so far as his own actions go; he can have as his epitaph what an octogenarian proudly said was going to be on his gravestone: "Here lies an ethical physician." But even if one fully intends to do right, he may not always do so, either from a lack of experience, or a failure in perception. Therefore, a code can be useful in formulating certain principles that have been found by experience to be valuable; it can stimulate and guide those who have not yet found themselves in puzzling situations, and who desire to profit by the experiences of others, and to be forewarned.

We all need, from time to time, to call upon the services of those who know more than we do; and if we do not admit it, our patients may justly insist upon our doing so. In either event, the consultation should be conducted with friendliness and dignity. We should not need rules as to just how to conduct the occasion; ordinary amenities and common decency should tell both the attending physician and the consultant how to act. But perhaps it is just as well to have these rules for the benefit of the thoughtless and inconsiderate. The consultant may be an older man who does not show the younger due respect. Maimonides prays: "Let me be patient and calm when older men of my profession, proud in the number of their years, crowd me out, or taunt me or offer jeeringly to belittle me. But let this too, be for my improvement, for they know things that are forgotten to me; still let not their conceit grieve me. They are old, and old age is not master of the passions. I too hope to grow old upon the earth before thee, O, All-good."

Embarrassing situations arise in consultations; the consultant may be asked how to get rid of the attending physician, or he may be asked to direct the case himself, or he may find that he is the last person in the world the patient desires to see. Frankness, candor and good nature will pull one through, though it will go hard with the doctor who thinks too well of himself, and who believes that he has a perpetual right of ownership in a patient when he has once been called in. A further complication exists when the patient himself is a doctor, for it

is a common failing of medical men to forget that, when one of their number is ill, he is like anyone else in his incapacity to use sound judgment concerning himself and generally needs, even more than does the layman, definite and rigid direction. It is universally agreed that a doctor is apt to make a poor patient; he knows too much about others and too little about himself. Because of his knowledge of possibilities, and because, like all human beings, he is subject to the apprehension that goes with illness, he may easily forget the ethics of his profession and his medical friends can forget theirs. One has only to have an illness which is not yielding to treatment to learn how easy it is to demand that everything, the irregular as well as the regular, be tried, and to find that he must forsake his contemptuousness and intolerance toward patients who turn to quacks for help!

There are many other general matters concerning ethics, but I shall touch on only two of them. The first is: How much should one tell the patient about his condition? It is generally agreed that one should use great care in what is divulged, but there need not be an air of mystery. Some individuals want to know and can stand knowing even the worst about themselves, and the circumstances may make it best that they should know; some want to know, but are going to be made sicker thereby; many, perhaps wisely, do not want to know. In the first place, when asked the direct question, we should decide, to the best of our ability, what course is for the patient's good; and, in the second place, we must remember that even our best judgment in prognosis is fallible. Who has not seen a patient for whom all hope of recovery had been given up by someone of great experience turn the corner and recover? And who has not seen a patient who had been told he was perfectly sound shortly prove the contrary by sudden death? He who considers his judgment infallible is not to be trusted. It hardly seems possible that anyone could maintain that the whole truth, when asked for, should always be given; and yet there are those who feel it inconsistent with their honor to do otherwise. I have seen the patient of such a one made unhappy and sick for weeks by being told too much of the possible truth, when an honest evasion based on humble doubt would have legitimately sent him on his way rejoicing.

The other matter concerns advice as to the patient's moral conduct given outright or through implication by physicians and laymen on the fringe of medicine. It has become the fashion to disregard discipline of all sorts, to free oneself from every kind of inhibition. It is true that some forms of illness come from inhibitions and the suppression of basic instincts, and a kind of well-being seems sometimes to be the result of release therefrom. But there are other forces equal, if not greater, in value and strength that must be considered and, if these suffer as the result of releasing the more primitive forces, physiologic improvement may be seen, but spiritual decay follows. Therefore it is a matter for serious ethical consideration how far the physician should allow himself to suggest or advise conduct that may be appropriate to his instincts but contrary to the aspiring spiritual forces that are just as much a part of man's nature. The physician need not be a moral censor, but he should not directly or indirectly condone a lack of discipline inconsistent with bodily and spiritual health.

Because there are various aspects of this subject that I have not touched upon, let me urge you to read thoughtfully the "Principles of Medical Ethics," not just the code itself, but as it appears in a most interesting and exhaustive presentation in the American Medical Association's *Bulletin* for May, 1936. Read also John Gregory's "Lectures on the Duties and Qualifications of a Physician" and Thomas Percival's "Medical Ethics."

Finally, let me read to you Percival's dedication of his book to his son, a student of medicine in the University of Edinburgh; "It is the characteristic of a wise man to act on determinate principles; and of a good man to be assured that they are conformable to rectitude and virtue. The relations in which a physician stands to his patients, to his brethren and to the public, are complicated and multifarious; involving much knowledge of human nature, and extensive moral duties. The study of professional ethics, therefore, cannot fail to invigorate and enlarge your understanding; whilst the observance of the duties which they enjoin, will soften your manners, expand your affections, and form you to that propriety and dignity of conduct which are essential to the character of a Gentleman. The academical advantages you have enjoyed at Cambridge, and those you now possess in Edinburgh, will qualify you, I trust, for an ample and honorable sphere of action. And, I devoutly pray, that the blessing of God may attend all your pursuits; rendering them at once subservient to your own felicity, and the good of your fellow creatures."

Vol. 2
193

POSTOPERATIVE PULMONARY COMPLICATIONS*

BY ALBERT H. MILLER, M.D.†

THE origin of the pulmonary complications which too frequently follow surgical operations is an unsolved problem. Although postoperative pulmonary complications had been noted at autopsy before the advent of anesthesia,[3] they were early ascribed to the irritating effect of ether vapor, with some justice, in view of the then crude methods of administration. Von Mikulicz,[8] reporting a higher incidence and mortality of pulmonary complications following local anesthesia, introduced doubt concerning the specific effect of ether vapor in the causation of these complications. Whipple[9] found the incidence of pneumonia after anesthesia as follows: local, 3.1 per cent; ether, 2.8 per cent; and gas-oxygen, 1.6 per cent. Sise[6] found the incidence of lung complications after anesthesia in general surgical cases to be local, 7.5 per cent; ether, 3.1 per cent; and gas-oxygen, 1.8 per cent. While the statistics of Whipple and of Sise favor gas-oxygen, the writer,[5] in a tabulation of 5,000 cases, found pulmonary complications more frequent after gas-oxygen than following ether. Brown and Debenham[2] found postoperative pulmonary complications five times more frequent after spinal than after inhalation anesthesia. They reported 7.4 per cent with the former and 1.3 per cent with the latter. In this connection it should be noted that the methods of administration and the prineiples underlying the choice of anesthetics vary greatly in different centers.

The attempt to compare different groups of published statistics of postoperative pulmonary complications has disappointing results. Many writers include only the complications which they consider significant, omitting minor complications and terminal pneumonias, while others search for all possible complications. From the literature one gains the general impression that pulmonary complications follow all varieties of anesthesia, that they are found more frequently after regional and spinal than following inhalation anesthesia, that they are favored by abdominal operations, especially by those on the upper abdomen,[7] that the technic of administration of the chosen agent is without effect in their causation,[7] and that there is an unusual liability to such complications when infection of the upper air passages is present.[4] It is not possible to obtain from the literature support for the statement made by the committee to investigate anesthetic accidents appointed by the American Medical Association that "such gases as nitrous oxide, ethylene, oxygen and carbon dioxide . . . kill less than one patient by explosion for each hundred or more that they probably save from death by postoperative pneumonia."[1]

In our experience, surgical and anesthetic technic has a very profound influence on the occurrence of pulmonary complications. By careful attention to details often neglected, we attempt, with considerable success, to avoid these postoperative mishaps. Respiratory infections already existent are more frequently benefited than made worse by careful general anesthesia; this confirms McKesson's observation that there is uniform lessening in the severity of pneumonia following gas-oxygen administration.

Even the slightest pulmonary complication is important. Even a cough may be a distressing thing for a patient convalescing from an operation. When careful search of records fails to show any considerable number of postoperative pulmonary complications, such records are worthy of study in an attempt to learn what feature of technic is responsible for this fortunate result. The series of cases here analyzed comprises 500 consecutive operations in one hospital, performed by one surgeon and his assistant, and with one anesthetist, thus insuring a stabilized surgical and anesthetic technic. The list of operations (fig. 1) includes a large proportion of the more desperate risks, 68.8 per cent being abdominal cases with 14.4 per cent involving the upper abdomen. There were 5 complete excisions of the rectum. The total mortality was 2.8 per cent. There were 6 pulmonary complications with 1 death, a mortality of .2 per cent. Except for the 2.8 per cent who died, all patients were discharged from the hospital apparently recovered. Operation was not refused with the object of maintaining a clear record, if it promised benefit to the patient.

FIGURE 1. *Operations.*

Group	Description	No. Cases	Occurrence Rate	Deaths
1	Appendectomy			
	simple	51		
	with tube or ovary	8		
	acute	49		
	with drainage	33		1
		141	28.2%	
2	Cholecystectomy	24		1
	with appendectomy	12		
	Choledochostomy	5		
	with cholecystectomy	6		1
		47	9.4%	
3	Abdominal hysterectomy	10		
	with appendectomy	18		
		28	5.6%	

*Read before the Boston Society of Anaesthetists, May 4, 1937.

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4	Herniorrhaphy	29		
	with appendectomy	5		
	for ventral hernia	1		1
		35	7.0%	
5	Intestinal resection	31		3
	with appendectomy	1		
		32	6.4%	
6	Gastroenterostomy	9		1
	with enteroenterostomy	2		
	with pylorectomy	1		
	with partial gastrectomy	1		
	with pyloric resection and cholecystectomy	1		
	Pyloroplasty	3		
	with cholecystectomy	2		
	Gastrostomy	1		
	For perforated duodenal ulcer	3		1
		23	4.6%	
7	Exploration for malignancy	4		1
	with colostomy	2		2
	For diverticulitis	2		1
8	Splenectomy	2		
9	Nephrectomy	5		
10	Excision of rectum	3		
	with sigmoid	2		
11	On pancreas	2		
	On ureter	3		
	Free adhesions	6		
	Ovariotomy	1		
	Drain abscess of abdominal wall	2		
	subphrenic abscess	1		
	psoas abscess	1		
	tubo-ovarian abscess	1		
	Growth of abdominal wall	1		
		38	7.6%	
	Abdominal operations	344	68.8%	
12	Laminectomy	2		
	Cordotomy	1		
13	Thoracoplasty	3		
	Rib resection	3		
	Cervical rib	1		
14	Septicemia, Drain abscess of thigh and empyema	1		1
15	Major amputations	1		
	Fractures	9		
	Others on extremities	18		
16	Thyroidectomy	15		
	Decompression	1		
	Craniotomy	1		
	Other operations on head and neck	13		
17	Major breast amputations	16		
	minor breast operations	13		
18	Hemorrhoids	23		
	Pilonidal sinus	4		
	Other rectal operations	16		
19	Vaginal hysterectomy	1		
	Other vaginal operations	9		
20	Prostatectomy	1		
	Circumcision	2		
	Perineal operations	2		
	Nonabdominal operations	156	31.2%	
	Total	500	100.0%	14

All patients underwent a preoperative examination. No patient was so sick as to prevent auscultation of the heart sounds and the recording of blood pressure. Operative risks were classified according to the International Anesthesia Research Society system (fig. 2). This method is more independent of the personal equation of the observer than any other system yet devised.

Estimation of surgical risk is not an idle mathematical exercise. It is a prognostication for the benefit of the patient and for the instruction of those who make the appraisal. Occasional deaths among class 3 risks are unavoidable. Absence of fatalities in this class would indicate unwillingness to undertake risks which the best interest of the patient requires. An unpredicted surgical fatality is a tragedy for patient, surgeon and anesthetist; it is a source of deep chagrin and calls for an exhaustive search for possible error, whether in prognosis or in technic.

Preliminary hypnotics used were as follows: avertin (22), paraldehyde (35), sodium amytal (48), pentobarbital (197) and morphine (384).

FIGURE 2. *Classification of Operative Risks.*

CLASS 1.	Patients free from organic disease, whose surgical condition is not likely to prove fatal	329
CLASS 2.	Patients suffering from organic disease, whose surgical condition is not especially serious	93
CLASS 3.	Patients whose surgical condition is so serious or so far advanced as likely to result in fatality	78
		500

The usual preoperative medication was 3 to 4½ grains pentobarbital, 1/6 to 1/4 grain morphine and 1/200 to 1/150 grain atropine. The anesthetics were: gas-oxygen-ether sequence 363 and gas-oxygen without ether 137. In 349 of the 500 cases a balanced anesthesia was obtained by the regional use of 1/2 per cent procaine solution. The amount of solution varied from 10 to 30 cc. It was used routinely in abdominal work and in many rectal cases. In this way the surgeon obtained satisfactory muscular relaxation without subjecting the patient to the effect of large doses of a general anesthetic. Often the amount of the latter was reduced by half.

The surgical work was done with gentleness, the use of metal retractors was avoided, and deep exploration was carried out in such a way as to take particular care to avoid stimulating those autonomic reflexes which many surgeons confuse with the rigidity that is due to insufficient anesthesia.

The general principles governing the anesthesia were asepsis and overoxygenation. Gas inhalers were thoroughly cleaned after each use. The gravitational ether method was used. This allows for a fresh, sterile inhaler in each case. When nitrous oxide-oxygen was used without ether, 10 to 50 per cent oxygen concentration was maintained. No trace of cyanosis was ever allowed. Realizing that the great difficulty in nitrous oxide-oxygen anesthesia is in overcoming the effect of anoxemia after once it has been allowed to develop, less than the 13 per cent of oxygen required to prevent this was permitted only for brief intervals. It has been objected that nitrous oxide-oxygen cannot be used in this way without proper preliminary medication. We agree that this is frequently, but not always, correct.

With the gravitational ether method, a fresh, clean, open ether cone, its evaporating chamber filled with sterile washed gauze, is applied closely to the patient's face. Through a 6 millimeter hairpin-shaped tube slipped into the top of

the cone, a flow of nitrous oxide at 4 gallons per minute enters the cone, sinks to the bottom because of its heavy weight and is breathed in by the patient. A flow of 10 per cent oxygen is immediately added. The total flow is then reduced one half. Ether is added to the evaporating surface of gauze, at first drop by drop, then more rapidly. The flow of nitrous oxide is gradually reduced until the patient is breathing ether vapor and oxygen. Ether is added at frequent intervals, in measured dosage, the amount used being regularly recorded on the anesthetist's chart. The flow of oxygen is continued throughout the operation by way of a pharyngeal tube introduced through one nostril. No trace of cyanosis is allowed at any stage of the anesthesia. Not only is the method clean and aseptic but it is approved of by the patient, who has no impression of a foul-smelling rubber inhaler, no ringing in the ears and no stage of excitement.

Particular attention is paid to operating room temperature and avoidance of drafts. At the completion of the operation, the patient is wrapped in blankets with the head covered before being moved through the hall. The anesthetist attends the patient throughout the operation and accompanies him to his room, checking room temperature, ventilation, freedom from drafts, and the posture of the body, head and limbs after being placed in bed. Nurses are cautioned against attempts to manipulate the jaw when the patient tries to retch or vomit. Displacement of the jaw forward opens the airway and favors entrance of regurgitated matter into the lungs.

In no case was stimulation required during an operation. If shock was suspected, the condition was immediately treated by modification of posture and increase in the flow of oxygen. The results of this treatment seem to support an unproved theory that, regardless of the primary cause, the serious effects of shock are due to anemia of the brain and medullary centers.

Deaths (fig. 3) were due to the original condition unless otherwise noted. All other patients, checked up at the end of 2 weeks or on discharge from the hospital, were on the road to recovery at least from any effect of the operation.

In a trying climate, with cigarette-smoking prevalent, it is not strange to find a considerable proportion of patients suffering from irritation of the respiratory mucous membranes. In the preoperative examination of these 500 patients, 50 respiratory affections were discovered. Twenty-two were noted as afflicted with a cough, which in 16 cases was bad enough to be listed as a complication; 15 patients suffered from coryza, listed as a complication in 9 cases; there were 2 cases of bronchitis, 2 of pneumonia, 1 of laryngitis, 1 of pleurisy and 1 of empyema. Five patients had healed or active tuberculous pulmonary lesions and 2 suffered from bronchial asthma. Altogether these patients showed respiratory improvement rather than an increase in symptoms from the effect of the anesthetic or other factors due to the operation. Only 6 of the 22 patients who were coughing before operation complained of a postoperative cough. The 2 patients with bronchial asthma had an entire remission of their bronchial symptoms for a week or more after the operation, substantiating our previous observation that the symptoms of bronchial asthma are temporarily alleviated by inhalation anesthesia, particularly by ether. None of the mild respiratory infections developed into more serious conditions.

FIGURE 3. *Deaths.*

Operation	Group	Risk Class	Age	Day of Death	Condition
1	3		6	2	Appendectomy with drainage, peritonitis
2	3		64	5	Cholecystectomy, choledochostomy, peritonitis
	3		73	2	Cholecystectomy, hepatitis
4	2		66	3	Hernia of scar, pulmonary embolism
5	3		58	5	Growth of small intestine, resection, lateral anastomosis, enterostomy
	3		74	1	Carcinoma of splenic flexure with perforation and abscess, resection, drainage
	3		48	2	Malignancy, resection of hepatic flexure, lateral anastomosis, cecostomy, recurrent coronary thrombosis
6	3		74	7	Carcinoma, gastroenterostomy, enteroenterostomy, colocolostomy
	3		78	7	Perforated duodenal ulcer, drainage
7	3		82	17	Diverticulitis of small intestine blocking chyle duct, exploration
	3		75	16	General abdominal carcinoma, exploration
	3		88	29	Rectal carcinoma, colostomy
	3		65	4	Annular carcinoma of sigmoid, cecostomy
14	3		40	13	Septicemia, drainage of thigh abscess and empyema

The following case report is illustrative of many others:

A female patient, aged 48 years, suffered from cholecystitis. Operation had been advised but had been postponed from time to time because of a severe cold. For 6 weeks this had been treated by a nasopharyngologist but with little benefit. It was finally decided that the operation must be performed in spite of the respiratory condition. Preliminary examination discovered no fault in heart, lungs or kidneys. The blood pressure was 140/100. There was a nasopharyngitis with an irritative, troublesome cough. The anesthetic of choice in such a condition is gravitational gas-oxygen-ether, supported by regional procaine. Preliminary medication was pentobarbital, 4½ grains by mouth in 1½ grain doses, and morphine 1/6 grain, and atropine, 1/150 grain, subcutaneously. Ten minutes was allowed for the gravitational gas-oxygen-ether induction; 30 cc. of 0.5 per cent procaine solution was used for balanced anesthesia. The gall bladder and appendix were removed, the operation lasting 55 minutes. Twelve fluid ounces of ether were used. Recovery was featureless except for vomiting of mucus once. No cough or sign of respiratory infection could be detected by the patient or the attendants at any time after the operation.

There were 6 fresh postoperative respiratory complications with 1 death, a mortality of 0.2 per cent (fig. 4).

The first of these cases developed a cough

without fever following the removal of a gangrenous appendix. The following day another patient developed a similar condition after removal of an appendix acutely inflamed but not gangrenous. The anesthetist immediately checked the sterilization of his apparatus. The third patient died suddenly on the third day after a long operation for repair of a ventral hernia. The fourth patient developed cough without fever following removal of a gangrenous appendix. The fifth patient was a husky schoolboy, aged 18 years; he was anesthetized immediately after a meal for an operation for acute appendicitis. At the close of the operation he vomited a large quantity of stomach contents. He soon developed a cough, with a temperature

FIGURE 4. *Postoperative Pulmonary Complications.*

Operation Group	Risk Class	Age	Day	Complication
1	3	44	1	Cough
1	1	35	1	Cough
4	2	66	3	Pulmonary embolism (fatal)
1	1	57	1	Cough
1	1	18	1	Bronchitis
5	3	77	3	Atelectasis

and signs of bronchial irritation. Forty-eight hours later he coughed up a mucous plug and thereafter rapidly recovered. The diagnosis was either inhalation bronchitis or bronchopneumonia. The last patient, a man of 77, on the third day after an operation, which included a resection of the cecum, ascending colon and one third of the transverse colon, and an ileocolostomy and enterostomy, suddenly developed consolidation of the lower lobe of his right lung. His recovery was uneventful. The principal anesthetic in this group of cases was ether.

Some observers would rule out the first, second and fourth of these complications as inconsequential, considering only three as significant. Others might include 12 of the 50 respiratory conditions which, although discovered at the preliminary examination, persisted during the postoperative course. I have chosen to tabulate all postoperative complications which, being unnoted at the preliminary examination, may be considered as the result of the anesthetic or of other operative factors. Of the 50 respiratory conditions discovered before operation, 12 persisted as postoperative complications, while 38 did not. In 2 of the 12 persisting cases, the cough was definitely more bothersome after the operation than before.

SUMMARY

In this paper it is attempted to prove that choice of method and care in administration of anesthetics are important factors in the prevention of postoperative pulmonary complications. Supposing, for the moment, that the records have been carefully taken and honestly reported and that they show fewer pulmonary complications than some other clinics where skillful surgeons are assisted by professional anesthetists, what explanation can be offered for the comparative freedom from such complications in this series of cases? First to be considered is balanced anesthesia. This, when combined with the regional use of procaine, provides muscular relaxation and permits surgical manipulation under a lighter general anesthesia. Other important factors are: the use of an excess of oxygen, with entire absence of anoxemia; the aseptic maintenance of anesthetic apparatus, thus preventing the carrying of respiratory infection from one patient to another; an even depth of general anesthesia, and the avoidance of the deeper zones; and the attention to minute details having to do with the care of the patient in the operating room and during the period of recovery.

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Vol. 2
193

PASTEURIZED VERSUS RAW MILK IN UNDULANT FEVER

BY J. I. WEISMAN, M.D.*

WITH mercantile interests still hammering away at the credulous public in order to sell it the idea of the superiority of raw over pasteurized milk, it does not seem amiss to take up once more the banner of the latter. The importance of doing so is all the more evident when we note the increased frequency of undulant fever in our Commonwealth, as well as in Connecticut, where this disease reached a new high in 1936 with a total of 99 cases reported.[1] It is this trend that justifies a report of our experience at Essex Sanatorium; it is presented with the hope that the value of pasteurization may receive additional emphasis.

The history of undulant fever is an old story, and one well known to the medical profession. In 1918 Alice Evans demonstrated the close similarity of *Bacillus abortus,* discovered by Bang in 1897, to Bruce's *Micrococcus melitensis.* This fundamental work led Mohler and Traub to interest themselves in the question of the pathogenicity for man of the bacillus of contagious abortion.[1] Culturally, *Brucella melitensis* and *Brucella abortus*—adopting the modern terminology—are similar; their source, however, is different. Bruce's organism was isolated chiefly from the secretions and excretions of goats. Bang's bacillus is said to be present only in cow's milk and excreta. Kushelevskiy[2] states that Malta fever is a disease found only in small-horned cattle, whereas contagious abortion is found only in large-horned cattle and in swine; the latter organism produces abortion and sterility in the female, and sterility in the male. He states further that, whereas *B. melitensis* is always pathogenic for man, *B. abortus* is only facultatively pathogenic. Carpenter[4] observed that in calves fed with infected milk the pharynx and lymph nodes became infected first and remained so the longest. This led him to examine human tonsils removed for the usual reasons. Of 56 pairs studied he was able to recover *B. abortus* in 8 cases; all 8 were taken from habitual drinkers of raw milk. Some of this milk came from herds known to be infected.

In reviewing the more common symptoms of undulant fever, one is impressed by their similarity to those of pulmonary tuberculosis. This similarity was first pointed out by the immortal Hippocrates. Since at Essex Sanatorium we were dealing with tuberculous patients, and in 1930 relied in part upon raw milk for our supply, our interest was naturally drawn to the possibility that we were harboring some individuals who were infected with *B. abortus.*

In January, 1930, Dr. Edwin Reynolds, of Danvers, examined 243 patients and employees of Essex Sanatorium with the cooperation of Dr. Merrill J. King, who was then working in the laboratories of the Massachusetts General Hospital. Thirty-eight individuals (15.2 per cent) were found whose blood contained agglutinins, the titers of which varied from 1:15 to 1:405.

Agglutinin Reactions

	1:15	1:45	1:135	1:405
Complete	34	18	7	1
Partial	4	5	0	0
Total	38	23	7	1

At that time the fallibility of the agglutinin reaction was not fully appreciated, hence skin allergy tests, described by Giordano in 1929, and opsonocytophagic tests[5] were not made. We did, however, believe that a titer of at least 1:80 was necessary for a diagnosis of active or recovered undulant fever. Only 10 cases fell within this category, and these were individuals who were either frankly tuberculous or not ill at the time. Dr. King regarded these results merely as additional evidence of human infection by *B. abortus;* contagious abortion among cows was fairly prevalent in Essex County at the time.[6]

Needless to say, there was little delay in insisting upon pasteurization of our milk supply. In July, 1932, Dr. Olin S. Pettingill suggested that agglutination tests be repeated upon all patients and employees at Essex Sanatorium. The writer, with the co-operation of the Wassermann Laboratory of the Massachusetts Department of Public Health, obtained tests on 312 individuals. *All were found to be negative* in titers ranging from 1:25 to 1:200. Included in this group were 23 patients *formerly positive.*

The conclusions are obvious. Pasteurization is effective in the prevention of infection by milk from cows with contagious abortion. Debate as to the comparative value of raw and pasteurized milk has been fostered by dairymen, who aver that by the use of elaborate sanitary procedures they can produce a raw milk at once safe and richer in vitamin content than is pasteurized milk. It is true that pasteurization will destroy much of the antiscorbutic property of milk, but it is equally true that the vitamin C content of raw milk is insufficient for the prevention of scurvy. The addition of vitamins to the diet in the form of cod liver oil and

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tomato or orange juice is an accepted procedure in either case.

The primary danger in raw milk lies in the possibility of its contamination with tubercle bacilli, typhoid bacilli, hemolytic streptococci and undulant fever organisms. From 1924 to 1929 milk-borne epidemics in this country resulted in the illness of 10,906 persons and the death of 371.[7] Nor is the problem of pasteurization peculiar to the United States. Lord Moynihan has pointed out that of 3,250,000 cows in England 1,000,000 were tuberculous; and while he has urged the increased use of milk, he has insisted that it be bacteriologically clean. D. Arnold Netter of Paris warns of the spread of undulant fever and states that pasteurization is effective in so far as cows' milk is concerned. Goats' milk will not stand sterilization, and if infected should not be sold.[8]

Milk consumption is not the sole source of undulant fever infection. A. Thomsen of Copenhagen does not believe in the transmissibility of this disease by milk, and holds that cutaneous contact with diseased animals is a far more likely cause. Of 65 veterinarians tested, 94 per cent showed agglutinins; of the reactions of 16 bacteriologists 62 per cent were positive; of those of 25 cattle attendants 62 per cent were positive, and of those of 20 milkmaids only one was positive.[9] Jordan and Borts of Iowa also show that rural people are more apt to become infected than are urban residents and that male farm workers are more prone to infection than females, who do not come in contact with the cattle and swine.[10] Contact is without doubt a mode of entry for this type of infection, but probably the consumption of raw dairy products containing brucella organisms is just as important.

Finally, we must educate the public concerning the dangers of raw milk products. Pasteurization should become available to 100 per cent of the population. All milk cows should be tested yearly for *Brucella abortus* infection, and eliminated if found to be infected. Undulant fever is not a common disease, but it may be entirely eradicated if the proper steps are taken.

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INSULATING PATCHES AND ABSORBABLE SUTURES MADE FROM FETAL MEMBRANES

BY HERBERT LESTER JOHNSON, M.D.*

THE purpose of this communication is to present a brief, preliminary report on the availability of fetal membranes for use as absorbable insulating patches and suture material. The source of these products is human amniotic membrane and bovine amniotic and allantoic membranes. No attempt will be made to present complete protocols as the work is still in progress and final conclusions cannot be drawn at this time.

Wound disruption from infection or the too early digestion of catgut with the formation of excessive amounts of serous exudate seems to be the chief factor in the demand for an improved absorbable suture. Poor end results in the repair of tendons and nerves and the occurrence or recurrence of large areas of postoperative adhesions in the serous cavities urge upon us the necessity of an absorbable insulating patch. Fetal membranes properly prepared, it is believed, will greatly alleviate most of the foregoing difficulties.

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Having developed a satisfactory method of collecting, curing and sterilizing the fetal membranes, our first concern was the reaction of the tissues to the product. This observation was made by burying small, folded, sterilized patches of the membrane in the right rectus abdominus muscle of the guinea pig and using a patch of sterile, ribbon catgut, of equal size and weight in the left rectus muscle as a control. Six animals were used for this experiment, two being sacrificed at 1 week, two at 2 weeks and the remainder at 3 weeks. Figures 1 and 2 show the comparative reaction of the tissues to allantoic membrane and ribbon catgut at 1 week. It is apparent, in this comparison, that catgut shows a wider zone of fibrosis. The abundant seropurulent exudate about the allantoic membrane is due either to bacterial contamination or possibly to a peculiar reaction to the membrane. Figures 3 and 4 show tissue and exudative response and degree of absorption at 3 weeks. It will be noted, in the longer observation period, that there is a smaller zone of fibrosis about the allantoic membrane than in the

vicinity of the catgut. There is also a notable lessening in the amount of exudate about the allantoic membrane. Small fragments of catgut are found with difficulty at this period, whereas the allantoic membrane appears well preserved.

FIGURE 1. Allantoic membrane buried 1 week in abdominal muscle of guinea pig.

The next observation was on the intraperitoneal use of a sterile insulating patch of allantoic membrane for the purpose of protecting a traumatized area of parietal peritoneum from adhesion to surrounding structures. The technic of this experiment was to open the abdomen by a

FIGURE 2. Ribbon catgut buried 1 week in abdominal muscle of guinea pig.

long, midline incision, to traumatize the parietal peritoneum and adjacent visceral peritoneum on both sides by scraping with a scalpel, held at a right angle to the surface, and then to cover the traumatized area on the right side by the insulating patch, leaving the left side unprotected. The patch was held in position by a single stitch of plain No. 0000 catgut at each corner. Figure 5 shows the gross results after 10 days. Figure 6 is a microscopic section taken

FIGURE 3. Allantoic membrane buried 3 weeks in abdominal muscle of guinea pig. Note excellent preservation of membrane and lessened amount of exudate.

from the center of the insulating patch shown in figure 5. Grossly it will be noted that the allantoic patch gave perfect protection to the traumatized area, completely preventing adhesions to surrounding structures, while the un-

FIGURE 4. Ribbon catgut buried 3 weeks in abdominal muscle of guinea pig. Note degree of absorption compared to allantoic membrane in same animal at same interval.

protected area, to the left of the abdominal incision, is covered by firmly adherent bowel and omentum. At the end of this 10-day period, the patch was not so firmly fixed to the abdom-

inal wall as in the specimens removed after a longer period. As a result, the membrane came off the surface of the microscopic section. The striking thing about the microscopic study of this protected area is the rapidity with which

FIGURE 5. Inner surface of rabbit's abdomen at 10 days. Note large protecting patch of allantoic membrane on the right side of picture entirely free of adhesions while large bowel and omentum are fixed to the unprotected traumatized control area on left side by dense adhesions.

the traumatized surface became covered with mesothelial cells. Some granulation tissue may also be noted.

A similar comparative study is shown grossly in figure 7. Here again complete protection of

FIGURE 6. Section of traumatized peritoneum, protected by allantoic patch, at 10 days. Note new formation of mesothelium and granulation tissue. Patch section fell off this specimen in the process of cutting.

the traumatized peritoneal surface by the insulating patch is noted while the unprotected control area is firmly adherent to the adjacent structures. Unfortunately the abdominal wound of this 30-day animal herniated, creating a distorted appearance in the gross specimen. A section for microscopic study (figure 8) was taken from the center of the protected area and shows strips of membrane covered by smooth-surfaced connective tissue.

FIGURE 7. Inner surface of rabbit's abdomen at 30 days. Note patch-protected, traumatized area on the right side of picture, free of adhesions. The unprotected control area on the left side shows dense adhesions of large and small bowel to the unprotected traumatized area. A perforated hernial sac may be seen above the experimental structures.

The patch experiments were repeated for the purpose of introducing other control substances. Instead of leaving the traumatized area to the left of the abdominal incision unprotected, it

FIGURE 8. Section of traumatized area protected by allantoic patch at 30 days. Note smooth surface of layer of connective tissue.

was covered in the different animals by such products as cargile membrane, ribbon catgut, human amniotic membrane and cellophane, all sterile, while the traumatized area to the right of the abdominal incision was protected in each instance by sterile bovine allantoic membrane.

Grossly and microscopically, the human amniotic and bovine allantoic membranes gave similar results. Of the other control substances, ribbon catgut most nearly simulated the gross effect of the fetal membranes. Cargile membrane called forth a marked connective tissue response and, in one specimen, was cartilage-like in gross appearance and consistence. Adhesions about this patch were abundant and dense. The surface of the patch, in the center, was covered by a heavy layer of connective tissue and was not adherent to any adjacent structures. The cellophane patch was surrounded

FIGURE 9. Calf's leg at 4 weeks. External tendon protected by human amniotic membrane and internal tendon protected by allantoic membrane. Note smooth, nonadherent sheaths over both tendons.

by a mass of adhesions so extensive that a portion of the liver surface was included in the mass.

To determine the protective effect of the bovine allantoic and human amniotic patches on traumatized tendons, two calves, 3 weeks old, were used as experimental subjects. These animals were operated upon under ether anesthesia. The extensor tendons of the left foreleg in each animal were exposed. The internal and external tendons and their sheaths were severely lacerated by multiple, longitudinal incisions and then repaired with running stitches of sterile suture made from bovine allantoic membrane in the external tendon and plain, No. 0000 catgut in the internal tendon. In calf 1 the internal tendon was covered, after operation, with two layers of a sterile human amniotic insulating patch and the external tendon was protected by a single layer of sterile bovine allantoic membrane, with a small overlap.

In calf 2 a similar technic was employed except that the internal tendon was left without patch protection, having been sutured with sterile sutures of bovine allantoic membrane. A single layer of allantoic membrane, plus overlap, was used on the external tendon, the latter having been sutured with plain, No. 0000 catgut.

Figure 9 shows the gross specimen of calf 1, 4 weeks after operation. Both traumatized tendons are covered by new sheaths which are entirely free from adhesions. While the sheaths are somewhat thick they are, nevertheless, functioning adequately. Figure 10 shows the gross picture in calf 2 at 4 weeks. Here the area of

FIGURE 10. Calf's leg at 4 weeks. External tendon protected by allantoic membrane, internal tendon unprotected. Note smooth, newly formed sheath over protected tendon versus dense adhesions between unprotected tendon and adjacent structures.

trauma in the external or protected tendon is covered by a new, somewhat thickened, but nonadherent, sheath. The sheath of the internal or unprotected tendon is densely adherent to the skin and adjacent structures.

Two weeks following the first operation these calves were again etherized, and their right legs were submitted to a traumatizing procedure similar to that used on the left legs. In calf 1, the external tendon was covered by three layers of sterile, bovine allantoic membrane to determine the effect of the use of excessive amounts of insulating material. The internal tendon was left unprotected. At 2 weeks a large smooth sheath, which was free from adhesions, had formed over the protected tendon, while a very thin sheath was present over the unprotected tendon with firm adhesions to the overlying skin. On opening these sheaths the tendons were found to be free within them. The unprotected tendon had ruptured so that the frayed ends were joined only by sutures. This and their freedom within the sheath may be accounted for, at least in part, by the fact that the calves' legs were not splinted.

Again, in calf 2, to determine the effect of excess material, the external tendon of the right

leg was protected, following operation, by two layers of a three-ply, sterile human amniotic patch, with enough overlapping to allow for fixation with a sterile bovine allantoic suture at each end. No membrane was used on the traumatized, internal tendon. At the end of 2 weeks the unprotected tendon was adherent to the skin and adjacent structures, while the protected tendon had a new, large, thick sheath, smooth on the outside and nonadherent. On opening the sheath a large amount of semifluid, yellowish substance exuded, which hardened quickly in the fixing agent. The tendon was free within the sheath.

In the course of this investigation selected, long pieces of cured amniotic and allantoic membrane were cut into narrow strips for the purpose of making twisted, absorbable sutures. The method followed was similar to that used in making catgut except that the twisting was done by hand under moderate tension. It was possible in this way to prepare sutures with a physical appearance like catgut and, on a roughly estimated manual test, remarkable tensile strength, which varied with the number of membranous strands, the quality of the membrane, the tightness of the twist and the tension and atmospheric conditions under which the suture was dried. Many of these sutures were sterilized by a suture manufacturer, using the same methods employed in the sterilization of catgut. Both sterile and nonsterile, human amniotic and bovine allantoic and amniotic membranous sutures were used in experimental animals late in this investigation, and a detailed report on the results will be included in a later communication.

COMMENT

The idea of protecting certain locations of the body from the formation of crippling, postoperative adhesions is not new. However, despite the number and variety of substances used, the problem has never been adequately met. By the use of properly prepared and preserved membranous patches, made from human amniotic and bovine allantoic and amniotic membranes, it is believed that a substantial contribution can be made to the successful handling of this difficulty.

A careful operative technic in the application of the patch is essential if good results are to be obtained. Gross and microscopic study of the tissues involved show that this new technic is safe and effective in the experimental animal. The use of insulating patches may prove especially applicable to surgery of the peritoneal cavity, tendons, nerves, blood vessels and joints.

Grateful acknowledgment is made of my indebtedness to Dr. John Beach Hazard for his invaluable aid in histologic interpretations, the preparation of tissues, and constructive suggestions throughout this experimental work. To Dr. G. Kenneth Coonse I am also deeply grateful for assistance in the tendon part of this investigation, and to Dr. Otto J. Aufranc I express sincere thanks for his assistance in the operative procedures.

FIGHT AGAINST GONORRHEA MUST FOLLOW CAMPAIGN TO STAMP OUT SYPHILIS IN WAR ON VENEREAL DISEASES

With the campaign to stamp out syphilis now well under way in the United States, a national effort to control the widespread prevalence of gonorrhea is the next step that must be undertaken in the fight against venereal diseases, in the opinion of Dr. William F. Snow, general director of the American Social Hygiene Association.

"The health authorities and the medical profession cannot hope to carry out effectively the necessary practical programs in attacking these diseases, unless the general public clearly understands and fully supports them with adequate appropriations and the active cooperation of individual citizens." Dr. Snow emphasizes this fact in a special number of the *Journal of Social Hygiene*, which reviews the findings of the recent Conference on Venereal Disease Control Work held in Washington, D. C., under the chairmanship of Dr. Thomas Parran, Surgeon General of the United States Public Health Service.

Although the conference in Washington rightly concentrated attention upon syphilis, which is the problem of immediate concern, the public should know that gonorrhea is the next to go, Dr. Snow explains. It has been estimated that approximately 6,000,000 men, women and children are suffering from syphilis in the United States and that more than 12,000,000 persons have gonorrhea.

"It would seem that by the sheer weight of the misery which gonorrhea produces throughout the world, it would force itself upon public notice," says Dr. P. S. Pelouze, professor of urology at the University of Pennsylvania, in a report on the medical measures which are needed for adequate control of gonorrhea. These are a few of the points to which he calls attention:

> The incidence of gonorrhea is at least twice and probably three or four times that of syphilis. What it may lack in ability to cripple and kill, it makes up easily in numbers. It may be acquired repeatedly and thus become a recurring cause of economic loss and poor health.
>
> The sterility which so frequently follows infection with gonorrhea forever denies parenthood to countless men and women who desire to be fathers and mothers.
>
> There is no treatment known today that lends itself to mass application and quickly renders the patient noninfectious. In the male the disease is practically 100 per cent curable, and in the female it should be almost as much so. But no one can predict just how long each case will require treatment to reach the point of cure.
>
> From a public health point of view it is necessary to recognize that gonorrhea is a disease that can be transmitted to others as long as there is a single gonococcus present. It is a disease the cure of which is dependent upon the patient's ability to develop certain curative responses.
>
> At no time has there been greater general medical interest in gonorrhea than exists today. Treatment has improved, so that the complications formerly seen so frequently have been largely eliminated.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT, M.D.

TRACY B. MALLORY, M.D., *Editor*

CASE 23221

PRESENTATION OF CASE

A 33 year old American factory hand was admitted complaining of abdominal pain and vomiting.

The patient had been perfectly well until 5 months before entry, when he suddenly became ill with "intestinal grippe", characterized by nonradiating, colicky, lower abdominal pain which was sufficiently severe to require the use of hypodermic medication. At the onset of the illness the temperature was 101°F., but this rapidly subsided. The patient was confined to bed for 10 days. There was no nausea, vomiting or diarrhea. Subsequently the patient returned to work but continued to feel rundown and became fatigued more rapidly than usual. There was no recurrence of the abdominal pain. Three days before coming to the hospital the patient took a mild laxative before going to work. During the morning he had repeated shaking chills, headache and severe pain in the back and loins. There were several loose bowel movements, the color of which was not noted. His appetite was poor, but he had a bowl of soup for lunch. Subsequently he felt very sick and returned to his home, where the soup previously ingested was vomited. He felt hot and restless, and his temperature was found to be 102.5°F. He slept fitfully, and on the following day felt quite fatigued. There were anorexia and nausea, but no vomiting. A mild laxative was again taken, and throughout the remainder of the day there were frequent loose bowel movements. He felt alternately hot and chilly but there were no further chills. His temperature at that time was 104°F., and a physician stated that he had a septic throat, although his throat was not sore. The symptoms continued unchanged during the day preceding admission, but at 2:00 o'clock on the following morning he began to vomit repeatedly. The vomiting was nonprojectile. The vomitus was variously brown, yellow and green in appearance. He felt feverish and again took a laxative which was followed by a series of loose bowel movements, the character of which was not noted. During the day he developed epigastric soreness, worse when moving about, which he attributed to straining when vomiting.

The patient had received typhoid vaccine 13 years ago, while in the Navy. During a one-year period, 12 years before his entry, four members of his family contracted typhoid fever. There were no related illnesses in his family since that time. He last visited his family 4 weeks before the onset of his illness. Four years preceding entry the patient had attacks of burning midepigastric pain. This was thought to be due to an ulcer, but x-ray studies were negative. Subsequently the symptoms subsided.

Physical examination showed a well-developed and nourished, pale young man, who was obviously acutely ill. The lips and nailbeds were slightly cyanotic and the mucous membranes dry. The pharynx was moderately injected, and there was a small amount of mucoid exudate. The cervical lymph nodes were slightly enlarged but not tender. Questionable dulness was elicited at the right base and right lower axilla. In this region tactile fremitus and vocal resonance were slightly diminished and questionable distant bronchial breathing was heard. There were also a few transient crackling inspiratory rales, which were dispelled by cough. The heart was not enlarged. A systolic murmur was heard in the apical region. The blood pressure was 120/75. There were tenderness and muscle spasm in the epigastrium, more evident to the right of the midline. Peristaltic sounds were normal. Rectal examination elicited slight tenderness on the right side.

The temperature was 104°F., the pulse 75. The respirations were 30.

The urine showed a specific gravity of 1.028 to 1.042, with a slight trace of albumin. The sediment was negative. The blood showed a red cell count of 4,600,000, with a hemoglobin of 86 per cent. The white cell count was 7,000, with 78 per cent polymorphonuclears. The nonprotein nitrogen of the blood serum was 15 milligrams per cent and the serum protein was 3.8 grams per cent. A Widal test showed agglutination of *Bacillus typhosus* up to a dilution of 1:320. Agglutination test for *Bacillus abortus* was negative. Three blood cultures were done; one was negative, the second showed *Staphylococcus albus* in one flask and hemolytic streptococcus in the other, and the third showed no growth in one flask and nonhemolytic streptococcus in the other.

A chest x-ray was negative. There was no free air beneath the diaphragm.

On the second hospital day the patient complained of severe upper abdominal pain. There was marked spasm in the right epigastrium, and peristaltic sounds were absent. On the following day he felt comfortable, peristalsis was again audible, and the abdomen was soft. Subsequently, similar episodes occurred and eventu-

ally the abdomen became distended, tense and tender, and peristaltic movement ceased. Another x-ray film with the patient recumbent showed obliteration of both sides of the diaphragm by dulness in the lower lung fields. The dulness was hazy in outline and extended higher on the left than on the right side. The heart was transverse in position. Throughout the hospital course the temperature remained elevated between 102°F. and 106°F. and the pulse rose progressively to 160. The white cell count also rose to 17,000, with 96 per cent polymorphonuclears. The patient's condition became progressively worse and he died on the seventh hospital day.

Differential Diagnosis

Dr. Walter Bauer: I think that the findings in the chest were due solely to a high diaphragm in a man who was very distended. It is obvious from this history that in the final days of his hospital stay the mischief was in the abdomen. When it started in the abdomen and what it represents are our problems. The next question is whether this attack of so-called intestinal grippe that he had 5 months previously was intestinal grippe and whether by any chance it was related to his final illness. There is only one suggestion that there might be any relation, and that is the fact that from that time on, up to the last illness, he was not up to scratch, did not have all the pep he would like, and, as he stated, he felt "a little rundown." I am inclined to believe, however, that this attack of right lower quadrant abdominal pain was more likely something that might pass under the name of intestinal grippe, rather than something related to the present illness. Nevertheless, we must still consider the possibility of this being a manifestation of something related to the final illness. In this day and age we are all regional-ileitis-minded, and we might think of that as a possibility, but the subsequent course makes it seem unlikely. A more reasonable thought would be some form of acute ulcerative colitis. We should think of either the idiopathic type or that due to one of the dysentery organisms. We can have fairly extensive colitis at times, with very little in the way of symptoms and signs to show for it. If this was the cause of his original illness, it had been silent for a period of some 5 months. Since he had right lower quadrant pain, one must entertain the possibility of appendicitis. It could be appendicitis, which may or may not have ruptured. I think it unlikely that he could walk around for 5 months with an appendiceal abscess without more in the way of signs, fever and the like. I think that is quite remote. If he had had appendicitis one might wonder if he had an associated pylephlebitis; but, again, there is nothing to suggest it. I think it is reasonable to assume that the pathology was in the large bowel. One might think that we were dealing with an individual who had multiple diverticula, one of which had ruptured. I should think, again, that it subsided too rapidly for that. I would be inclined to say that the illness 5 months before was in no way related to the final illness.

Three days before coming into the hospital he had a shaking chill, with sudden, severe pain in the back and loins. To me this means nothing more than a man coming down with an acute infection. One might wonder, since he had so many chills, if he did not have an actual blood stream invasion at that time, and whether we are now dealing with a septicemia or bacteremia. Whether this diarrhea that he had had for 3 days was anything more than that induced by catharsis, is again difficult to say. I think that interpretation is much more reasonable than to say that he had a second flare-up of ulcerative colitis. It would be unusual for a man to be as sick as this, with his temperature going as high as 104°, without more pain in his abdomen if he had a severe enough ulcerative colitis to give this picture. Furthermore, the possibility of colitis could not be entertained for long because we have no further information about the stools, tenderness along the colon, or anything of that sort, which would help to make such a diagnosis. So I would be inclined to throw out the possibility of this man having ulcerative colitis.

I suppose the one thing that is really striking and that we must either take seriously or throw out is the question of typhoid fever. He had a temperature of 104°F. and a pulse of 75, a white count of 7,000, and a positive Widal of 1:320. A positive Widal this early in typhoid is very unusual. On the other hand this man had been vaccinated. Did the Widal become positive nonspecifically because the individual was suffering from a severe infection of some sort? I personally would be inclined to interpret it in that way. If he has typhoid we have to presuppose that he has ruptured his small intestine, but again if this is typhoid it is far too early in the course of the disease for such a complication. There is absolutely nothing on physical examination that would point to typhoid. There are no rose spots, no enlargement of the spleen, and no lead whatsoever that would enable one to make that diagnosis. People with septicemia have chills and fever, and at certain times they have relatively slow pulse and low white count, whereas at some subsequent time a high pulse and an increased white count will develop. Therefore, I would throw out the possibility of typhoid fever. As I said before, he evidently died because of something very radically wrong within his abdominal cavity.

One of the first things we should think of is whether we are dealing with an individual with peritonitis subsequent to rupture of some viscus.

But there is nothing here to enable me to say that he had a ruptured viscus. His last illness started without any abdominal pain or symptoms. For 3 days the only symptom he had, with reference to his gastrointestinal tract, was diarrhea, which may have been due to frequent catharsis. They evidently suspected a ruptured viscus because several flat plates of the abdomen were taken. On no occasion did they find anything suggesting air under the diaphragm.

This question of whether he may or may not have had ulcer 4 years ago is thrown in for good measure, but again there is nothing in the history to allow me to believe that he has a ruptured ulcer and subsequent peritonitis.

The other possibility is whether we might be dealing with a man with multiple diverticula and associated diverticulitis with rupture and peritonitis or abscess formation. There is nothing in the physical examination which would allow one to state that that had been the case.

I would like to know if he had a septic throat. I think it is unusual without an antecedent sore throat, but his illness evidently started off with an acute infection and probably a blood stream invasion almost from the start. If he had had a septic sore throat, that could be the source of entry for such an infection. Of all the laboratory work, the only blood culture on which I think we can really place any reliance is the one which contained hemolytic streptococcus. It is unusual to get hemolytic streptococcus as a contamination, whereas the other two organisms could conceivably be contamination. So we can say that we have some laboratory evidence which enables us to state that we are dealing with an individual who does have a septicemia. I would be inclined to take one long guess on this man and say that he probably had a peritonitis secondary to the septicemia, and that he died of a hemolytic streptococcus peritonitis. If you want to call it idiopathic in origin, all well and good. I could go on and make a complete differential diagnosis, but I do not think I would get any farther than making this one guess. I cannot entertain the question of typhoid and the various other things very seriously. If he did not die of streptococcus peritonitis, I have no idea what he had.

DR. WILLIAM B. BREED: While you are guessing, I wonder why you lost interest in the appendix in the middle of your discussion. The point is, we have been tricked a great many times by the appendix, and this story could be perfectly well accounted for by an atypical appendix right from the start.

DR. BAUER: The thing that intrigued me when I first went over the history was the fact that we might be dealing with a lesion that started 5 months ago as an attack of appendicitis. It is possible that he had a ruptured appendix at that time and had been carrying an appendiceal abscess since then. You see an occasional individual walking about with an appendiceal abscess for some time, with very little in the way of symptoms; but such individuals are very rare. The other thing that intrigued me was whether he could have a pylephlebitis secondary to appendicitis; but he goes 5 months without chills, fever or jaundice, and no tenderness of the liver—never anything to suggest it. When we come to the final illness, it is hard for me to believe that the first 3 days represent anything more than an acute infection. There is nothing in the history except diarrhea to suggest anything in the abdomen, and for that diarrhea we have a reasonable explanation, that he took a cathartic on these 3 days. Not until the fourth day were the symptoms referable to the abdomen, and then they do not sound much like appendicitis. I suppose there is a possibility that I may have missed a ruptured appendix with widespread peritonitis. He came in with a temperature of 102°, a pulse of 75 and a white count of 7,000. I think that set-up with an acute appendix would be unusual, even if it had ruptured. I think that if it had ruptured he would have obvious signs of peritonitis. It was not until the fourth or fifth day that he presented evidence that made me feel certain of peritonitis. I think a pulse of 75 and a temperature of 102° in appendicitis with or without rupture is an unusual set-up.

DR. BREED: It is an unusual set-up under any circumstances.

DR. BAUER: No one knows better than I.

DR. HORACE K. SOWLES: Idiopathic peritonitis is rare at that age.

DR. BAUER: I appreciate that it occurs usually either in childhood or adolescence. I wish we knew whether he had a septic sore throat. That is important, that plus the positive blood culture.

DR. J. H. MEANS: I do not believe that it is not an idiopathic peritonitis. I would have asked the same question Dr. Breed did, why you abandoned appendicitis and diverticulitis so readily. I also wonder if one should not consider the possibility, at least, of a local and general sepsis due primarily to cancer somewhere in the colon.

DR. BAUER: There is very little to suggest anything in the colon. My experience is that colitis cannot go on without any evidence.

Why do you say that he died of appendicitis with rupture and so forth? The way I interpret the history is that he has gone 3 days without any evidence of anything in his abdomen. I would like to have the reaction of one of the surgeons on that. Does his illness during the first 3 days sound like appendicitis to you, Dr. McKittrick?

DR. LELAND S. MCKITTRICK: I would say not, on the evidence we have here.

DR. BAUER: I should think that the same sort of reasoning would be correct if you are going to presuppose diverticulitis with rupture. I think that the abdominal examination on the fourth hospital day would be different from what it is. I grant you that I am making a long guess, but I have thought a great deal about this case, and I could not reason it out any other way. I do not believe that he had a ruptured viscus.

DR. EDWARD L. YOUNG: The rectal examination rules out long-continued appendicitis. It is true that pelvic abscess and appendicitis could explain the story, but here we have a rectal examination that rules them out.

A PHYSICIAN: Four members of the family have had typhoid fever. He perhaps was a typhoid carrier and was ill several days before he came down with an acute chill.

DR. BAUER: You mean that he was a carrier for 12 years and then came down with typhoid? I could not make a diagnosis of typhoid because of the rapidity with which this man's illness goes from the time he became ill. In that case we would have to presuppose a rupture of a Peyer's patch on about the fourth day of the illness.

DR. HAROLD L. HIGGINS: I think that he was ill before he had the chill. He was ill when he took the laxative.

DR. BAUER: The only story we have is that he was rundown and not up to par. If he has had for 5 months the presymptoms of typhoid, it is unusual. I prefer to date his illness from 3 days before he entered. If he has typhoid he has ruptured on the fourth day, and that is too early; besides, there is no good evidence.

DR. HIGGINS: I do not believe that the positive Widal of 1:320 would come from vaccination 12 years before.

DR. BAUER: A positive Widal of 1:320 to 1:100 is pretty unusual for the fourth or fifth day of typhoid fever.

DR. HIGGINS: I do not think it is the fourth day; I think it is the tenth day.

DR. BAUER: Even the tenth day is unusual.

DR. BENJAMIN CASTLEMAN: Dr. Dienes, could a Widal become positive in an individual who has been previously vaccinated if he subsequently falls ill with an acute infection?

DR. LOUIS DIENES: Yes, we have good evidence that it does. In typhus patients, if they come from surroundings where typhoid fever is prevalent, the Widal reaction often becomes positive in the first few days of the disease, before the development of the Weil-Felix reaction. In rabbits the antibodies which have disappeared from the serum sometimes are recalled by intravenous injections of nonrelated antigens. The early presence of agglutinins, as Dr. Bauer pointed out, speaks probably for the nonspecific nature of the agglutination.

DR. BAUER: May I ask one question, Dr. Dienes? Which of these three positive blood cultures is the most significant?

DR. DIENES: I agree that the hemolytic streptococcus is the most significant. I cannot remember a single case in which we obtained hemolytic streptococci from the blood as a contaminant, while *Staphylococcus albus* is a common contaminant of blood cultures. I believe that if he had typhoid fever the culture would be positive for the typhoid bacillus and not for hemolytic streptococcus.

DR. GEORGE W. HOLMES: The x-ray simply confirms Dr. Bauer's remark in regard to localization of the disease below the diaphragm and nothing in the chest. In the film taken later there is evidence of fluid in both pleural spaces, which would correspond with infection arising from below the diaphragm.

DR. WYMAN RICHARDSON: I was asked to see this patient 3 or 4 days before he died and to transfer him because of typhoid fever. At that time he had, I thought, definite tenderness in the lower quadrant with spasm, and although there were peristaltic sounds it seemed to me obvious that he had peritonitis. A great deal of comment occurred in regard to the presence of peristaltic sounds in this man, the commentators feeling that this ruled out peritonitis. In view of the fact that he had general peritonitis, and we felt that it was probably due to some inflammation of some viscus, I followed my father's dictum, that he probably had atypical appendicitis with peritonitis.

CLINICAL DIAGNOSES

Typhoid fever?
Atypical appendicitis with peritonitis?

DR. WALTER BAUER'S DIAGNOSES

Acute hemolytic streptococcus peritonitis.
Septicemia, *Streptococcus hemolyticus.*

ANATOMIC DIAGNOSES

Acute generalized peritonitis, *Streptococcus hemolyticus.*
Septicemia, *Streptococcus hemolyticus.*
Acute pleuritis with effusion, *Streptococcus hemolyticus.*
Acute pericarditis, *Streptococcus hemolyticus.*
Septic spleen.
Duodenal ulcers.
Pulmonary atelectasis.

PATHOLOGICAL DISCUSSION

DR. BENJAMIN CASTLEMAN: The autopsy on this man showed a diffuse acute infection of his abdominal cavity. There was a thick, yellowish, fibrinous exudate all over the peritoneum. No areas of localization or abscess formation were found. We hunted carefully for a source in

the abdomen, but were unable to find one. He did have, however, two ulcers in the first portion of the duodenum, but although fairly acute they showed no evidence of perforation. His ileum was perfectly normal. There was slight injection of the jejunum, but no evidence of perforation anywhere. We felt that the diagnosis was idiopathic hemolytic streptococcus peritonitis, and were able to confirm it by culturing the organism from the peritoneum. He had a small amount of fluid in the pericardium and in each pleural cavity from which we were also able to culture hemolytic streptococci. The blood culture at autopsy was also positive for hemolytic streptococcus. It is, as Dr. Sowles said, quite unusual to find this condition in an adult. I looked through our autopsy records and found only one or possibly two other cases in adults. One was in a man of 50 who had a septic sore throat and 3 or 4 days after the sore throat had abated the abdominal symptoms began. In children, however, it is not at all uncommon. We have had about five or six cases in which the infection started as a sore throat and the patients ultimately died of the peritonitis. In this case the record states only that the pharynx was red.

A PHYSICIAN: Do you think his illness 5 months before had anything to do with it?

DR. CASTLEMAN: I do not see how it could. An interesting theory as to the pathogenesis of this disease was described a few years ago by Felsen and Osofsky.* They reported eight autopsied cases, three in adults and five in children, in all of which there was a history of a previous sore throat. The organisms cultured from the peritonitis were of the nonhemolytic type of streptococcus. In four of their cases they were able to reproduce the disease in rabbits by the intravenous injection of broth cultures of the organism. In most of the rabbits erosions and ulcerations were found in the ileum, and they felt that the peritonitis developed from a permeation through the intestinal wall (even if there was no necrosis of the wall) of the organisms which had originally reached the intestine through the blood stream. Their experiments were well controlled and the antigenic similarity of the organisms was checked by the complement fixation test.

*Felsen, J., and Osofsky, A. G.: Pharyngogenic hematogenous streptococcic peritonitis. Arch. Surg. 31:437 (Sept.) 1935.

CASE 23222

PRESENTATION OF CASE

First Admission. A 59 year old American real estate agent was admitted complaining of inability to urinate.

About 3 months before entry the patient developed nocturia which rapidly increased to a frequency of three to four times. He noted at the same time diminished caliber of the urinary stream, difficulty in initiating the flow, and burning dysuria. Associated with these symptoms were frequency, progressively increasing to the point where micturition every hour became necessary. Two days before coming to the hospital dysuria increased, and on the day of entry there was complete inability to void. There was no hematuria or lumbar pain.

Three years before coming to the hospital the patient noted a small mass in the left axilla, which grew to the size of a golfball within a short period. It remained unchanged for the succeeding 2 years, but then grew considerably larger. There were no associated symptoms. One year before admission the patient had a sudden attack of vertigo, for which he was confined to bed for 2 weeks. A physician informed him that he had "a close call" but gave him no reason for the statement. The remainder of the past history was noncontributory.

Physical examination showed a well-developed and nourished, pale, elderly man, who appeared to be quite apprehensive. In the region of the left axillary line was a moderately firm, nontender, orange-sized mass, which was not fixed to the underlying ribs or to the overlying skin. The adjacent skin exhibited considerable vascular dilatation. The heart was normal, and the lungs were clear. The prostate was symmetrically enlarged, firm, smooth, and nontender.

The temperature, pulse and respirations were normal.

The patient was catheterized, and the urine showed a specific gravity of 1.010, with a large trace of albumin. The sediment was loaded with red blood cells and contained an occasional white blood cell. Intravenous injection of phenolsulphonephthalein showed 15 per cent excretion of dye at the end of 2 hours. The nonprotein nitrogen of the blood was 80 milligrams per cent. The blood showed a red cell count of 3,900,000, with a hemoglobin of 60 per cent. The white cells numbered 10,200. A blood Hinton test was negative.

An x-ray film of the chest was negative. A cystogram showed a slightly lobulated defect in the floor of the bladder, which was consistent with an enlarged prostate.

An indwelling catheter was inserted, and the patient was treated supportively. On the thirty-first hospital day a suprapubic cystostomy was performed. Except for an occasional rise of temperature to 101°F., the patient's course was afebrile. The nonprotein nitrogen of the blood gradually subsided to 42 milligrams per cent. A basal metabolic rate determined on the forty-third hospital day was +27. Three days later the patient was discharged with a cystostomy tube in place.

Second Admission, 2 1/3 months later. Fol-

lowing discharge the patient was treated for his genitourinary condition in the Out Patient Department. During this period the axillary mass rapidly increased in size to a point where it became impossible for him to allow his arm to hang straight at his side. At the same time the overlying skin became ulcerated.

Physical examination was essentially unchanged, except for the fact that the axillary mass now measured 14 centimeters in diameter, was hard in consistency and sagged considerably when the patient stood upright. The suprapubic tube was draining well. The prostate was still symmetrically enlarged.

The temperature, pulse and respirations were normal.

Examination of the urine showed a specific gravity of 1.016, with a slight trace of albumin, but it was otherwise negative. The blood showed a red cell count of 4,200,000, with a hemoglobin of 75 per cent. The white cell count was 5,900, 75 per cent polymorphonuclears. The nonprotein nitrogen of the blood was 34 milligrams per cent.

An x-ray of the chest showed a large soft-tissue mass in the left lateral chest wall. The mass was freely movable. The remainder of the examination was negative.

On the fifth hospital day the mass was dissected en bloc together with a small amount of pectoralis major and latissimus dorsi, to which it was fairly adherent. It was apparent that the tumor was made up of huge lymph nodes, and many smaller nodes measuring up to 2 centimeters were felt in the axilla. No attempt was made to do a radical dissection. The pathologic report was Hodgkin's disease.

The patient responded well postoperatively, and the wound healed readily. He was discharged on the fourteenth hospital day.

Final Admission, 2 months later, 6½ months after his initial entry. Following his discharge the patient remained in good condition. His spleen was palpable 5 centimeters below the costal margin, and the liver was said to be enlarged, although details were not recorded. Shortly after discharge he received x-ray treatment to the extent of 600 r. to the left axilla and 600 r. to the lateral spleen, both in 200 r. doses. Two weeks later he was given 900 r. to the prostate through an anterior pubic field and another 900 r. through an oblique perineal field. The treatment was completed within 3 weeks of his discharge. He remained well for about 2 weeks and then 3 weeks before re-entry he began to feel weak and to suffer from profuse night sweats. The sweats, however, were not associated with fever. There was progressive loss of appetite. One week before returning to the hospital he noticed that his eyes were yellow. Subsequently he developed a rapidly progressive jaundice and his urine became very dark in color. The stools were said to be clay-colored.

Physical examination showed a well-developed, markedly jaundiced man showing evidence of considerable recent weight loss. The mucous membranes were pale. A suprapubic tube drained brownish urine freely. A few small, discrete lymph nodes were palpable in the cervical region, but there was no significant adenopathy. The lungs were clear. The heart was normal, and the blood pressure was 110/70. The spleen was enlarged to the level of the umbilicus, and the liver, which was slightly tender, to the crest of the right ilium. The prostate was enlarged and firm, but was now said to be nodular in configuration.

The temperature was 101°F., the pulse 100, and the respirations were 20.

The urine showed a moderate amount of bile, but was otherwise negative. The blood showed a red cell count of 4,400,000, with a hemoglobin of 70 per cent. The white cell count was 6,800, and a differential count of 50 cells showed 72 per cent polymorphonuclears, 10 lymphocytes, and 18 monocytes, about half of which were said to be atypical in appearance. The stools were clay-colored and mushy in consistency. A guaiac test was negative. A Takata-Ara test was negative. The nonprotein nitrogen of the blood was 59 milligrams per cent. The serum protein was 4.3 grams per cent, the serum calcium 9.57 milligrams per cent, and the phosphorus 3.89 milligrams per cent. The phosphatase was 22.78 milligrams per cent of bilirubin.

An x-ray film of the chest was essentially negative. The spine showed rather large intervertebral disks with slight bulging into the vertebral bodies. There was, however, no evidence of osseous destruction.

The patient's course was progressively downhill. The jaundice deepened, and he developed signs of ascites. Despite the administration of supportive treatment, he died on the eighth hospital day.

Differential Diagnosis

Dr. Alfred Kranes: To review briefly the patient's history on his first admission, we have a man who during a period of 3 months developed fairly rapidly progressive urethral obstruction to the point of complete retention on admission. Physical examination, except for a large prostate and a mass in the left axilla, which the patient described, was essentially negative.

The laboratory findings show a certain amount of renal insufficiency as evidenced by the renal function tests. He was put on constant drainage, his renal function improved and, finally, before discharge, a cystotomy tube was put in place and he became very much better. The thing that puzzles me at the first admission is

the elevated metabolic rate of +27. I do not quite see why that was done. There is no indication from the history that the patient was thyrotoxic except for the statement that he was moderately apprehensive. I do not think that in itself is enough. So far as the blood in the urine is concerned, I think we might explain it on the basis of catheterization. There is only one examination given and no statement is made as to whether the subsequent specimens also contained blood. Then he was discharged and went along well except that the mass in the left axilla began to increase rapidly in size. He came back to the hospital and the mass was biopsied. On his return the renal function was apparently very much improved as the result of adequate drainage. The report on the biopsied mass was Hodgkin's disease. Is it fair for me to ask if that was the Hodgkin's type of lymphoma?

DR. TRACY B. MALLORY: Yes, it was.

DR. KRANES: He was discharged again, and received a thorough course of x-ray treatment during the following 3 weeks, and then returned 5 weeks later with deep and rapidly progressing jaundice. The laboratory work on the final admission still showed a fairly good renal function, except that the nonprotein nitrogen had gone up a bit. He had developed no anemia. Another thing that puzzles me is why the blood calcium and phosphorus were done.

The elevated phosphatase I think we can explain on the basis of obstructive jaundice. It does not necessarily mean there is any disease of the bone.

DR. GEORGE W. HOLMES: This first film shows the axillary mass lying on the chest wall and this second film, taken, I suppose, after irradiation, shows that it has disappeared.

DR. MALLORY: It had been completely removed by operation.

DR. HOLMES: It is rather unusual for Hodgkin's disease to present as extensive a lesion as that in the tissues of the chest wall and no changes in the mediastinum or thorax. The heart is not particularly enlarged, and there is no evidence of disease of the ribs. Then, his spine and pelvis were carefully examined, but there is no evidence of neoplasm in the bone. I cannot explain this widening of the intervertebral spaces. I do not believe it is of any importance in the diagnosis. It may be something that happened years ago. He was said to have an enlarged prostate, and these cystograms were done. With a large prostate there is usually more of a filling defect in the neck of the bladder. It may be that the bladder is overdistended, so that it does not show; but I would doubt that he had a very large prostate. The outline of the bladder is now a little irregular, as though the mucosa might be thickened.

DR. KRANES: The problem in this case is a fairly simple one, although I cannot say as much for the solution. It seems to me that the whole thing boils down to the question of whether this man died of lymphoblastoma, which we are told that he had, or whether in addition he had some other disease in the abdomen. Of course it is always statistically safer to explain everything on the basis of one diagnosis if you are able, and certainly lymphoblastoma will explain everything that this patient had—the spleen and the large liver, and it could occur in the prostate, although it is unusual there. I think that if I were taking care of this patient and had seen him on the ward, lymphoblastoma would probably be the diagnosis I would make to explain the whole picture, but what is sound and logical on the ward is not always so at these conferences. Dr. Mallory has frequently shown us patients who have had more than one fatal disease at postmortem, and I think this patient was one of those individuals who had in addition to lymphoblastoma something else which killed him. If we start with that as a premise we can find a number of points against lymphoblastoma, although it can, as I have already stated, explain the whole picture. In the first place, he did not make a very satisfactory response to x-ray. We are not told whether the spleen or the prostate diminished in size after treatment, but we do know that 5 weeks after the cessation of his treatment he came back with a spleen much larger than originally and a prostate that was said to be nodular, which I think is rather unusual for a Hodgkin's type of lymphoma. If Dr. Mallory had told us that this was a reticulum cell sarcoma, it would seem more reasonable; that is, the reticulum cell sarcomas do not respond so well to x-ray, although they sometimes do very satisfactorily. Another reason that lymphoblastoma does not seem to explain the whole picture is that we have to postulate two rather unusual sites of localization for lymphoblastoma, one in the prostate, which I think is decidedly unusual, although we all know that lymphoblastoma can occur practically anywhere, and the other is in the periportal lymphatics. This patient came in finally with what looked like the obstructive type of jaundice. That is fairly obvious. He had a very intense, progressive jaundice, a high phosphatase, clay-colored stools and direct reaction to the van den Bergh, so that it sounds like obstructive jaundice. For lymphoblastoma to produce obstructive jaundice, it would have to pick out these periportal lymphatics, thereby producing a fairly selective obstruction and, although it can occur, I think it is unlikely without ascites being present as well. This patient did not develop ascites until the end. We see a great many patients dying with abdominal lymphoma in whom marked jaundice is very uncommon, so that I think we will probably have to look elsewhere for the lesion that caused

the obstructive jaundice. If he did have another process going on, just what the nature of it was is not at all clear.

Did the patient have carcinoma of the prostate with metastases to the liver? Although that is possible, it does not seem very likely, because it does not explain certain findings. Carcinoma of the prostate does not often metastasize to the liver. If it does eventually metastasize to the liver, it almost always will have metastasized already to the pelvis. This patient shows no sign by x-ray of any involvement of the pelvic bones or of the spine. For prostatic metastases to go to the liver without involving the pelvis would be unusual. In addition, this is not the picture of metastatic carcinoma of the liver. Patients may have tremendous involvement of the liver with metastases, and yet the degree of jaundice is not very great. Most of the liver may be replaced with carcinoma and still no detectable jaundice be found. This patient's jaundice was very intense, and I doubt whether a metastatic process would show that sort of thing. So I am inclined to believe that the prostate was not malignant.

I have assumed, of course, that this jaundice was of the obstructive type. Could it be an intrahepatic jaundice due to cirrhosis or terminal acute yellow atrophy? Terminal acute yellow atrophy would explain the rapid downhill course of this patient and would explain the blood picture at the end, but I cannot quite reconcile that with the large liver, which was down to the crest of the ilium. Could it be some other form of cirrhosis? It possibly could, and I think that the patient did have biliary cirrhosis, but that it was due to obstruction. What the nature of the obstruction was is very difficult to say. One wonders whether it could be due to a common duct stone but this patient has had no pain. He has had some fever, of course, but he might have that with lymphoblastoma, or as a result of obstruction, or from many causes. Although one cannot rule out common duct stone, I think it is rather unlikely. The other possibility is neoplastic involvement of the head of the pancreas or bile ducts, and I think that was the nature of his obstruction, that he had tumor pressing on the common bile duct, probably at the head of the pancreas. I think it is practically impossible to say what the nature of it was, whether it was lymphoblastoma or carcinoma of the head of the pancreas. I have already discussed the arguments against lymphoma as the only diagnosis, and I would like to believe that this patient probably had, in addition to his lymphoma, an independent carcinoma of the head of the pancreas or bile ducts which had caused acute obstruction and finally death with liver insufficiency. Of course, this is a pretty rapidly downhill course for that type of lesion, but we must remember that this patient had in addition a certain degree of renal insufficiency which impaired his health to some extent, so that he was not in good shape to start with. What the nature of the prostatic enlargement was, I do not know. Whether it was lymphoma or plain benign prostatic hypertrophy, I have no way of telling.

DR. WYMAN RICHARDSON: I saw this patient early in his last admission, when the jaundice was not so severe, but even at that time he was beginning to have the peculiar odor of the breath that patients have who die of liver failure. I thought he had an acute destructive process in the liver, which I thought was subacute yellow atrophy, and that he probably had infection in addition. I thought that the prostate probably was benign hypertrophy and that he had Hodgkin's disease in addition. From that time on he went rapidly downhill, became intensely jaundiced and died, obviously a liver death; but although we thought the liver might have decreased somewhat in size, it still remained a very large liver. My thought was that he died of acute yellow atrophy and that the other things were incidental.

CLINICAL DIAGNOSES

Subacute yellow atrophy.
Lymphoblastoma, Hodgkin's type.

DR. ALFRED KRANES'S DIAGNOSES

Hodgkin's disease.
Carcinoma of the head of the pancreas.
Benign prostatic hypertrophy?

ANATOMIC DIAGNOSES

Lymphoblastoma, Hodgkin's type, of the liver and spleen.
Icterus.
Benign hypertrophy of the prostate.
Pyelo-uretero-vesical calculi, bilateral.
Pyelonephritis.
Cystitis.
Thrombosis of periprostatic plexus.
Arteriosclerosis, coronary, with occlusion.

PATHOLOGICAL DISCUSSION

DR. MALLORY: The postmortem examination showed various types of lesions, but I think the important one was his Hodgkin's disease, which was practically limited to the spleen and the liver. The liver was more completely and diffusely filled with Hodgkin's tissue than any I can ever remember having seen; every single portal vein throughout the liver showed what looked almost like a leukemic infiltration. The similarity to leukemia was apparent also in the spleen, where there was subendothelial invasion of many of the radicles of the splenic vein. This is quite common in lymphatic leukemia, whereas one does not see it in many other con-

ditions. The prostate showed benign hypertrophy. The kidneys showed very extensive pyelonephritis, and he had an old coronary occlusion, which I think had nothing to do with any of the symptoms. The final question is, of course, the cause of his jaundice, and I do not know whether it is possible to answer it from the autopsy findings. There was obstruction of the extrahepatic bile ducts. My personal impression is that it was due simply to massive infiltration of Hodgkin's disease. The autopsy was done rather long postmortem and there was slight degeneration in the centers of the lobules, but to my mind not sufficient to justify a diagnosis of toxic hepatitis. It was certainly no more than we see in a considerable number of patients at autopsy who have no jaundice. So my personal feeling is that it was an intrahepatic obstructive jaundice.

DR. RICHARDSON: Clinically he went downhill too rapidly for that. He died in a week from the time he first began to be jaundiced.

DR. MALLORY: He had replacement of a tremendous amount of liver tissue by Hodgkin's disease, so that he did not have very much liver tissue. The bone marrow showed an enormous number of monocytes in it, and that again brings up the question of the relation between monocytic leukemia and Hodgkin's disease. There were many areas in this liver that would pass for infiltration of monocytic leukemia.

DR. HOLMES: Was the prostate large?

DR. MALLORY: It was fairly large.

A PHYSICIAN: Was this the sarcomatous type of Hodgkin's?

DR. MALLORY: There were relatively few Sternberg cells. The majority of the cells were mononuclear cells, which to my eye are indistinguishable from typical monocytes. There were scattered Sternberg cells present, however, in all areas.

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HIGHER EDUCATION IN MEDICINE

IN this country there exists to a degree encountered probably nowhere else a demand for education. This presumptive right of the public to be educated, however, laudable as the ambition is, has nevertheless imposed heavy strains upon our primary and secondary public school systems, especially the latter, and has resulted in an inevitable lowering of scholastic standards.

Taxation, on the whole, is for the benefit of the masses, and the masses expect that an educational system shall offer its benefits to their children as far as it is supported by taxation. In these years when economic opportunities for youth have been limited, more children at a higher age have demanded educational opportunities; it is not difficult to foresee the effect that a constitutional amendment limiting the gainful employment of children under eighteen years of age will have upon our secondary school system. Already the standards of our high schools have had to be lowered to conform to the average ability of their classes, and the state universities themselves are the victims of a popularity that renders the maintenance of a high academic level increasingly difficult.

The endowed universities, in the face of this broader but shallower flood course that the stream of free education has taken, must still more rigidly maintain their dikes and levees so that the current of true learning shall remain in its own deep channel. The evidence points to the fact that they are conscious of their obligations.

Columbia University, basing its program of graduate medical education upon the need of the country for better, rather than more, physicians, provides two plans — one for the continued education of physicians in practice, and one for the adequate training of specialists. For the first a wide variety of short courses has been organized in the hospitals and clinics affiliated with the University; for the second a sort of Ph.D. degree in medicine, officially a Doctor of Medical Science (Med. Sc. D.), was created by the Trustees of the University in 1932.

The requirements for this degree are:

1. Graduation from a medical school approved by Columbia University.
2. Completion of an internship of not less than one year in a hospital approved by the University.
3. A period of study after the internship of not less than three years in the University or in hospitals and laboratories recognized by it. At least one calendar year must be spent in the University or in one of the hospitals affiliated with it.
4. Intensive graduate training and original work in one or more of the basic medical sciences of anatomy, embryology, physiology, biological chemistry, pharmacology, pathology and bacteriology, related to the special field of study elected.
5. An active experience during the three-year period of not less than eighteen months in the hospital, clinics and diagnostic laboratories of the specialty elected.

6. Written, oral and practical examination in the specialty elected and in clinical, laboratory and public health fields to which the specialty is related.
7. An acceptable dissertation on an investigation conducted in, or closely related to, the specialty elected.

In medicine, as in other walks of life, plausibility often passes for ability. Columbia intends that its specialists shall be worthy of the name.

MENINGOCOCCIC TYPES

THE confusion that has so long existed in the serologic classification of the meningococci adds to the difficulties of the physician in applying specific serum in the treatment of meningococcic meningitis. To reconcile all the serologic groups, as established by Dopter, Gordon and Murray, Nicolle, Debains and Jouan, Griffith and Scott, Flexner, Wadsworth, and Evans, has been a problem that has perplexed immunologists.

In concluding a recent communication, Branham wrote:

Classifications of meningococci, worked out in the years 1909-1918, represented true serologic relationships which can be plainly recognized today.

Certain changes in these relationships have taken place; types I and III have become so closely interrelated that separation into two types no longer seems to be of definite value in practical everyday work. This I-III or A group has become markedly predominant in nearly all parts of the world that have been heard from.

On the other hand, types II and IV have in the United States at least become entirely distinct from each other so that they represent two separate groups. There seem to be three types of meningococci: I-III, II and IV. The designation B cannot be well applied to a combination of two such distinct groups as II and IV.

Studies made long ago and at the present time seem to indicate a greater number of type II strains in carriers. This large number of carriers of strain II in proportion to the very small number of type II cases brings up this question: Is II less pathogenic than I-III? This idea finds some support in the following fact: Although 70 per cent of all strains isolated from blood were type II, nearly all the cases of meningococcic endocarditis in which the type has been determined have been due to the I-III group. There is some evidence that type II is especially apt to be responsible for septicemic and generalized forms of meningococcic infection, which may be relatively mild or chronic.

The immunologic picture portraying the prevalence of serologic groups among the meningococci is ever-changing. The epidemiologist and the immunologist must be constantly on the alert to detect the appearance of strains of the organism that differ from previously recognized groups, and there must always be continuing studies on the identities and interrelations of the strains occurring throughout the world. It is obviously impossible for serum manufacturers to keep abreast of the developments in the field so far as meningococci are concerned. Nor would it be economical to do so in all instances even if it were possible. The sporadic appearance of aberrant types is far too infrequent to warrant the inclusion of all new strains in the vaccine used for the immunization of horses. The manufacturers must rely upon representative strains of standard groups that have been found to be the most frequent cause of meningitis, but the situation is not so simple as it seems. The set of cultures employed differ in the various producing laboratories, and horses develop varying responses to the immunizing treatment; so, therefore, divergences must inevitably occur in the immunologic properties of serums coming from many sources.

Should the particular lot of serum administered to the patient of the moment fail in satisfactory therapeutic effect, the clinician should, accordingly, try the product of another manufacturer. With a supply of serum of different origins, with the serologic identification of the infecting organism in a given case, and with the selection, by laboratory test, of an immunologically appropriate serum, a greater measure of success should attend the efforts of the clinician in the treatment of meningococcic meningitis.

REFERENCE

Branham, S. E.: The significance of serologic types among meningococci. J. A. M. A. 108:692 (Feb. 27) 1937.

BOSTON SURGICAL SOCIETY

THE AWARD OF THE HENRY JACOB BIGELOW MEDAL

THE Henry Jacob Bigelow Medal of The Boston Surgical Society, Incorporated, was awarded on Friday evening, May 21, at the Boston Medical Library, to Edward W. Archibald, B.A., M.D., C.M., F.R.C.S. (England) Hon.

The society was incorporated in November, 1914 "for the purpose of advancing the science and art of surgery and the cultivation of intellectual and social relations between the members." Under the will of William Sturgis Bigelow, in memory of his father, a sum of money was presented to the Society, "the income of which is to be used from time to time for the presentation of a gold medal to some outstanding surgeon for his work in the advancement of the science of surgery."

In the past the medal has been awarded to the following distinguished surgeons: W. J. Mayo, W. W. Keen, Rudolph Matas, Chevalier Jackson, G. G. Turner, J. M. T. Finney, and Harvey Cushing.

Dr. William C. Quinby, president of the society, presented the medal to Dr. Archibald, describing briefly the growth of McGill University and its place in the development of Canadian surgery. Dr. Archibald, professor of surgery and director of the surgical department, McGill University Faculty of Medicine, and chief surgeon, Royal Victoria Hospital, Montreal, addressed the members and guests of the society on the subject of "French Surgery in the First Half of the Nineteenth Century." He emphasized the essential unity of North American medicine, and traced the influence of the French School on the development of the spirit of scientific inquiry in American surgery, as exemplified by the life and work of Henry Jacob Bigelow.

Following the presentation ceremonies, a reception was held and a collation was served in the library rooms.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

O'CONNOR, JOSEPH W. M.D. Harvard Medical School, 1907. Instructor in obstetrics, Tufts College Medical School. Visiting obstetrician, Memorial Hospital, Worcester. Consulting obstetrician, Fairlawn Hospital, Worcester; Holden District Hospital, Holden; Harrington Memorial Hospital, Southbridge; and Webster District Hospital, Webster. Address: 36 Pleasant Street, Worcester. His subject is "The Medical Society and Maternal Mortality." Page 961.

LUNT, LAWRENCE K. M.D. Harvard Medical School, 1914. Address: Valleyhead, Concord, Mass. His subject is "George W. Gay Lecture on Medical Ethics." Page 965.

MILLER, ALBERT H. M.D. Columbia University School of Medicine, 1898. Formerly, president of the American Association of Anes-

thetists, the Boston Society of Anaesthetists and the Rhode Island Medical Society. Consulting anesthetist, Rhode Island, Providence Lying-In, Memorial, Butler, St. Joseph's, Charles V. Chapin and Truesdale hospitals. Editor, Rhode Island Medical Journal. Address: 28 Everett Avenue, Providence, R. I. His subject is "Postoperative Pulmonary Complications." Page 973.

WEISMAN, J. I. M.D. Boston University School of Medicine, 1932. Formerly, assistant physician at Essex Sanatorium, Middleton; and intern, Springfield Hospital. Now, assistant city physician in charge of Welfare Clinics, City of Springfield. Address: 116 Ft. Pleasant Avenue, Springfield. His subject is "Pasteurized Versus Raw Milk in Undulant Fever." Page 977.

JOHNSON, HERBERT LESTER. M.D. Tufts College Medical School, 1914. F.A.C.S. Director of surgical research, Faulkner Hospital, Boston. Address: 520 Commonwealth Avenue, Boston. His subject is "Insulating Patches and Absorbable Sutures Made from Fetal Membranes." Page 978.

The Massachusetts Medical Society

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CASE HISTORIES

No. 22. COEXISTING INTRAUTERINE AND EXTRAUTERINE PREGNANCY

Mrs. M. F., a white housewife, 39 years old, was seen by her local doctor on March 2, 1934. She complained of lower abdominal pain of one-half hour's duration. The onset of the pain had been sudden and its intensity so severe that she had nearly fainted. The pain was steady in character and had persisted in unabated form. She was sent immediately to the hospital where she was seen in consultation.

There was no family history of tuberculosis, diabetes, malignancy or hemorrhagic disease. At the age of 12 the patient had had diphtheria, with no sequelae. She had had no operations and she had always considered herself extremely well. Her periods had begun at the age of 14. They were quite regular, of the 28-day cycle, lasting 5 days. Her last period was January 13, 1934. She had had no miscarriages. She had had three pregnancies, 16, 15 and 12 years previously. These children were living, and the pregnancies and deliveries were normal.

On examination, she was a well-developed and nourished woman, extremely pale, in obvious pain. The heart and lungs were negative. The breasts were firm, Montgomery's glands showing some engorgement. The abdomen was spastic and extremely tender in the left lower quadrant. The extremities were normal. Systolic blood pressure was 80, diastolic 40. Her pulse was only 80 but of very poor quality. Vaginal examination showed a somewhat relaxed introitus; the cervix bilaterally torn and soft; the fundus anterior, in the midline and somewhat enlarged. The left vault was extremely tender, but no definite mass could be felt. A preoperative diagnosis of ruptured left tubal pregnancy was made, and operation under gas and ether was done immediately.

The abdomen was opened without incident through a lower abdominal paramedian incision. Fully a liter of largely unclotted blood was encountered free in the peritoneal cavity. The uterine adnexa were readily mobilized and the source of the bleeding was found to be from a 1-centimeter rent in the isthmus of the somewhat distended left fallopian tube. The uterus was slightly enlarged and the possibility of a coexisting intrauterine and extrauterine pregnancy was suggested at the time. The extruded products of the ectopic gestation were not discovered in the course of the operation. The left tube was excised. Seven hundred and fifty cubic centimeters of blood in the peritoneal cavity was sponged out, strained through gauze and citrated; the citrated blood was reintroduced by gravity into the left antecubital vein. The abdominal wound was closed in layers without drainage. The patient made an uneventful recovery and was discharged from the hospital 23 days after operation.

On returning home she showed signs of a normal intrauterine pregnancy and complained of symptoms compatible with that diagnosis. Vaginal examination 1 month later confirmed this diagnosis. No complications to her intrauterine pregnancy developed, and on October 19, 1934, she was delivered normally of a girl weighing 10 pounds, 2 ounces. She nursed her baby and after an uneventful postpartum convalescence was discharged from the hospital 20 days after delivery.

Comment. Coexisting extrauterine and intrauterine pregnancy is unusual but not an extremely rare finding. The literature reveals approximately 225 authentic cases. Of this number a living child was delivered from the intrauterine pregnancy in but 35 per cent.

*A series of selected case histories by members of the Section will be published weekly.
Comments and questions by subscribers are solicited and will be discussed by members of the Section.

There was very little question in this particular case of the diagnosis of ruptured tubal pregnancy. Had a routine confirmatory curettage been done before laparotomy, this pregnancy would have been lost, and it is barely possible that the operator's judgment would have been so swayed by the intrauterine pregnancy that the laparotomy might have been delayed, possibly with a fatal result.

MISCELLANY

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS FOR MARCH, 1937

Diseases	March, 1937	March, 1936	Five-Year Average*
Anterior Poliomyelitis	1	0	1
Chicken Pox	1471	1137	1162
Diphtheria	12	21	74
Dog Bite	762	677	538
German Measles	106	816	1223
Gonorrhea	462	485	490
Lobar Pneumonia	790	768	609
Measles	3773	3975	3940
Meningococcus Meningitis	31	39	13
Mumps	971	2477	1230
Scarlet Fever	1184	1307	1564
Syphilis	657	492	438
Tuberculosis, Pulmonary	315	268	353
Tuberculosis, Other Forms	45	42	41
Typhoid Fever	9	5	6
Undulant Fever	0	4	2
Whooping Cough	2013	399	1068

*Based on figures for preceding five years.

RARE DISEASES

Anterior poliomyelitis was reported from Boston, 1.

Diphtheria was reported from Boston, 1; Chicopee, 1; Fitchburg, 1; Holbrook, 1; Lexington, 1; Lowell, 1; New Bedford, 4; Peabody, 1; Worcester, 1; total, 12.

Dysentery, bacillary, was reported from Newton, 1.

Meningococcus meningitis was reported from Boston, 10; Bridgewater, 1; Cambridge, 1; Chicopee, 1; Fall River, 1; Greenfield, 1; Leominster, 2; Lexington, 2; Northampton, 1; Pepperell, 1; Quincy, 2; Springfield, 3; Sunderland, 1; Tewksbury State Infirmary, 1; Waltham, 2; Worcester, 1; total, 31.

Septic sore throat was reported from Andover, 7; Beverly, 1; Boston, 4; Cambridge, 1; Lawrence, 1; Lynn, 2; Medford, 1; Melrose, 1; Quincy, 2; Southbridge, 1; Webster, 1; total, 22.

Trachoma was reported from Lynn, 1; Medford, 1; Quincy, 1; Watertown, 1; total, 4.

Trichinosis was reported from Cambridge, 1; Lawrence, 1; Medford, 1; Pepperell, 1; total, 4.

Typhoid fever was reported from Andover, 1; Boston, 1; Hingham, 1; Medford, 1; New Bedford, 1; Pittsfield, 1; Taunton, 1; Winthrop, 1; Worcester, 1; total, 9.

Diphtheria had the lowest reported incidence for any month ever recorded. This makes the sixth consecutive month of record low monthly figures.

This was the only month in two years without a reported case of undulant fever.

Whooping cough had the highest recorded figures for any year to date. The reported incidence for March was the highest ever recorded except for 1926.

The reported incidence of lobar pneumonia continues above the five-year average, although the incidence of this year to date is about the same as that for last year.

The reported incidences of chicken pox, pulmonary tuberculosis and meningococcus meningitis continue above the five-year average. The March figure for meningococcus meningitis, however, was below that of last year.

For the first time this year, the monthly incidence of measles was below the five-year average.

The reported incidences of German measles, mumps and scarlet fever continue below the five-year average.

The reported incidences of anterior poliomyelitis, tuberculosis (other forms) and typhoid fever were not remarkable.

The reported incidence of animal rabies continues higher than last year, although below the five-year average for the month. Foci of animal rabies are most noticeable in Athol, Methuen, North Metropolitan Area, North Shore, Norwood and Walpole.

CONNECTICUT NEWS

State Health Department Will Make Child Health Study

With the object of promoting greater opportunities for child health, the State Health Department is to make a study during the next few months of community resources for health improvement. The department feels that facilities of the communities for promoting child health must be extended. Public-spirited citizens, the medical profession and other health leaders have joined in urging the provision of adequate child health facilities.

Tuberculosis Tests Started in Two High Schools in Hartford

In a drive to cut down the high Hartford death rate due to tuberculosis, the Board of Education has started tuberculosis tests of pupils in the Bulkeley and Weaver high schools. This campaign is being financed by the Hartford Tuberculosis and Public Health Society. It is hoped that unsuspected cases will be thus discovered before the disease has gained serious headway. Limited funds prevent the extension of the examinations to the third high school in Hartford. This city has a far higher percentage of deaths from tuberculosis than cities of similar size, such as Syracuse and New Haven. Although the actual number of deaths attributed to tuberculosis has steadily declined since 1880, it is still responsible for more deaths per hundred thousand population in Hartford than any two other causes.

New X-Ray Machine Invented by Connecticut Man

A new x-ray machine which sees around bones and takes accurate cross sections of any tissue of the

body at any depth was recently demonstrated for the first time to members of the American College of Physicians at their annual congress in St. Louis. Dr. Sherwood Moore of the Edward Mallinckrodt Institute of Radiology of Barnes Hospital stated that this machine makes possible what has hitherto been impossible, since pictures can be made of a layer of tissue to an accuracy of one centimeter.

This machine was invented by Jean Kieffer, superintendent of the Mechanical Laboratories of the Connecticut State Tuberculosis Hospital at Norwich.

In operation, the improved x-ray tube is mounted above a table at the top end of a vertical shaft. A holder containing the x-ray film is attached under the table to the lower end of the shaft. A motor drive on the vertical shaft moves the tube and film in opposite directions to each other. These movements of the tube and film apparently have a directive action on the beams of the x-ray passing between the two and also a selective action which makes possible the "picture slices", Dr. Moore said. The depth at which a cross section is to be taken is determined by a simple adjustment of the height of the tube and its motion.

Extensive clinical applications of the machine are planned, but thus far it has been used solely to perfect its accuracy by making test pictures of the body and inanimate objects.

Hospitals of Connecticut Lose Money on State Paupers

On the basic rate of four dollars per week per patient paid the thirty-three general hospitals of the State, the larger hospitals have been experiencing a very appreciable monetary loss. Even with an additional grant of $20,000 received last year, St. Francis Hospital, Hartford, had a deficit from state patients of $16,173 and Hartford Hospital of $32,000. An effort has been made to get a bill through the General Assembly raising the weekly rate paid by the State for hospital care of State paupers from four to twelve dollars. Even with this increase it would not equal the cost of the care to the hospital. This increase in rate would mean an increased cost to the State of $100,000.

Campaign Against Venereal Disease in Hartford

The Hartford Board of Health, through its recently formed Bureau of Communicable Diseases, has embarked upon a vigorous and sustained campaign to reduce syphilis and gonorrhea. A program of education will be fostered with as much publicity as is possible so that the public will be informed on symptoms, treatments and cures of these diseases. For the first time a clinic will be established for children for the treatment of congenital syphilis. The Board of Health will establish a central agency so that institutions treating persons with venereal disease may report negligent cases to it. In this way it should be possible to get such cases back to their institutions.

Survey of Water Supplies for Private Schools

A survey of drinking water supplies for private schools in Connecticut has been made recently. The source of supply in each school was checked. All private water supplies were inspected, and samples were collected and analyzed where recent analytical data were not available. Twenty-six schools with private supplies were visited. Wells and springs were found to be used entirely as sources of these supplies, except for one auxiliary cistern supply and a surface water supply recently abandoned. Recommendations for needed sanitary improvements were transmitted to the school managements, and local health officers were advised. Periodic analyses were recommended. In general, sanitary conditions were found to be satisfactory.

Recent Deaths

PIERSON—Samuel Pierson, M.D., aged 79, for fifty years one of Stamford's leading physicians and surgeons, died in the Stamford Hospital on April 22 after a long illness. Dr. Pierson was born in Morristown, N. J., graduated from Columbia University College of Physicians and Surgeons in 1881 and soon after began practice in Stamford. He served two terms as a member of the City Board of Finance and for twenty-five years was president and director of the Stamford branch of the Y.M.C.A. He was a Fellow of the American College of Surgeons and for years a member of the staff of the Stamford Hospital. Three sons survive him.

HALLOCK—Frank Kirkwood Hallock, M.D., aged 76, medical director of Cromwell Hall for the past thirty-nine years, died at his home in Cromwell on April 29 after an illness of about a year. Dr. Hallock was well known in the medical profession and was recognized as the first in America to establish an institution for the treatment of nervous invalidism on an educational basis, combining medical, physical and natural agencies with the psychologic analysis and interpretation of the individual personality.

Dr. Hallock was born at Oyster Bay, L. I., on August 18, 1860. He was graduated from Wesleyan University in 1882 with a bachelor of arts degree and special honors in chemistry. Three years later he was awarded a master of arts degree at the same institution and the degree of doctor of medicine from Columbia University College of Physicians and Surgeons. While in college Dr. Hallock was elected to membership in Phi Beta Kappa and Psi Upsilon fraternities. After internship in a New York hospital, Dr. Hallock went to Europe for two years of study. He returned to this country in 1889 and nine years later, in 1898, became medical director of Cromwell Hall, succeeding his father, Dr. W. B. Hallock, who died during that year. Until that time the institution had been chiefly a place for research, but Dr. Frank Hallock made it a hospital for the treatment of nervous invalidism, the first of its kind in the country.

During the World War Dr. Hallock became a member of the State Council of Defence, Medical

Section, and a captain in the ambulance corps of the Sixth Infantry, C. N. G. He retired from the latter position several years ago. Among the medical associations in which Dr. Hallock was prominent are: American Medical Association; American Neurologists' Association; New York Neurologists' Society; New York Academy of Medicine; Boston Society of Psychiatry and Neurology, of which he was president in 1923; Association for Research in Nervous and Mental Disease; Connecticut Medical Society, of which he was president in 1911; the American Association for the Advancement of Science, and the Beaumont Club of Connecticut, a medical historical society. Dr. Hallock had been a trustee of Wesleyan University since 1917.

Dr. Hallock leaves two sons, Abraham Avery Hallock, of Cromwell, and Leonard Avery Hallock, of New York; two daughters, Mrs. Sinclair W. Armstrong, of Providence, R. I., and Mrs. James G. Vermillion, of Newport, R. I.; a sister, Mrs. William P. Couch, of Cromwell; and three grandchildren, Winthrop H. and Anne M. Vermillion, and Avery Kirkwood Hallock.

CROCICCHIA—ANTHONY CROCICCHIA, M.D., aged 69, of New London, died at the home of his son in Waterbury on May 2. Dr. Crocicchia was born in Rome, Italy, on October 13, 1867. He was graduated from the University of Rome in 1893 and came to the United States in 1896, landing at Baltimore. The following year he was made demonstrator of surgery at Georgetown Medical School, Washington. Later he engaged in private medical practice in New York, also serving as dispensing oculist at Columbia Hospital. In 1918 he settled in New London, where he continued his practice. He was a member of the New York and Connecticut Medical societies and was licensed to practice in New York, Massachusetts, New Jersey, Connecticut and the District of Columbia. Dr. Crocicchia married Emma Vannutelli, deceased, the daughter of Count Henry and Agnes Vannutelli, of Rome, in 1896. She was a niece of Cardinals Vincent and Seraphine Vannutelli and Baron Kunzler, general-in-chief of the Papal Soldiery at the Vatican. Survivors include three sons, a daughter and two brothers.

CORRESPONDENCE

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH TO DISTRIBUTE BISMUTH SUBSALICYLATE

Editor, *New England Journal of Medicine*,

Beginning July 1, 1937, this Department will distribute bismuth subsalicylate in oil for the treatment of syphilis. Distribution will be made without charge to physicians, clinics, hospitals and institutions in the same way that arsenicals have been distributed during the past nineteen years.

This product will be available in 60 cc. and 12 cc. vials. The larger size is recommended for clinics and institutions which treat large numbers of patients. The smaller size is recommended for private practitioners since it will be convenient to label each bottle with the name of the patient to be treated and reserve the bottle for a course of treatment for that patient.

The Department wishes to emphasize that this product is to be used only for the treatment of syphilis and for no other purpose. Instructions as to its use will accompany each package, as will also an order blank for use in securing further supplies.

It is recommended that no physician order this material in anticipation of a patient to treat with it and that those physicians who do have patients with syphilis order only a sufficient amount to serve their needs for not more than six months at a time. The Department will insist that every physician who orders this product, or any arsenical from the State supply, must have reported cases of syphilis as evidence that he needs the drugs for the treatment of that disease.

Orders should be forwarded to the Antitoxin and Vaccine Laboratory, 375 South Street, Jamaica Plain, and should indicate the number of vials desired. Unless otherwise indicated, it will be assumed that an order from a physician should be filled with the 12 cc. vial.

Very truly yours,
HENRY D. CHADWICK, M.D.,
Commissioner of Public Health.

OFFICIAL ACTIONS OF THE BOARD OF REGISTRATION IN MEDICINE

State House, Boston

May 22, 1937.

Editor, *New England Journal of Medicine*,

This is to inform you that at the meeting of the Board of Registration in Medicine held May 20, 1937, it was

Voted: To revoke the certificate and cancel the registration of Dr. Leslie A. Burns of Millers Falls, because of repeated violation of the Harrison Narcotic Law and continued use of narcotics for other than therapeutic purposes.

Voted: To revoke the certificate and cancel the registration of Dr. Roy L. Garland of Gloucester, because of conviction in court on a charge of abortion.

Yours very truly,
STEPHEN RUSHMORE, M.D., *Secretary.*

RECENT DEATH

SULLIVAN—DANIEL THOMAS SULLIVAN, M.D., of 22 Pleasant Street, Mansfield, died at his home on May 27. He was in his sixty-seventh year.

Dr. Sullivan was graduated from New York University and interned at the Bellevue Hospital, New York. He was school physician in Mansfield for 15 years and had just been re-elected to that position.

He was a member of the Massachusetts Medical Society and the Mansfield Council, K. of C.

His widow, Mrs. Helen L. Sullivan, two daughters, Miss E. Eleanor, and Miss Deborah, and a son, Robert, survive him.

OBITUARY

AN APPRECIATION

Dr. Emma L. Call, one of America's pioneer women physicians, passed away on May 3, 1937, in her ninetieth year at the New England Hospital for Women and Children in Boston.

It seemed fitting that her death should have occurred at the hospital with which she had been connected for over forty years. Even before her graduation from the University of Michigan Medical School in 1873 she had served as student intern in 1869.

A woman of sound, conservative judgment, she initiated many of the hospital policies which time has proved to be the most progressive and efficient. She lived to see its rapid growth and was gratified.

Quick and keen to take up each new development in medical science, she gave unsparingly of her time in the hospital wards and in teaching younger women clinical medicine and obstetrics, though she did no research or writing.

Since retirement from active practice twenty years ago she kept remarkably well informed on current medical thought.

Dr. Call felt that there was definite need of well-trained medical women in the community, constantly urged them to high standards and did much to make the path easier for those who followed her.

She was a member of the American Medical Association; the Massachusetts Medical Society, of which she was the first woman member in 1884; of the New England Women's Medical Society, of which she was one of the founders in 1878, and of Alpha Epsilon Iota Medical Sorority.

The Staff of the New England Hospital hereby records grateful appreciation of her long, useful career which did so much to open and broaden many opportunities for women in medicine.

REPORT OF MEETING

SPECIAL LECTURES IN ENDOCRINOLOGY

Dr. Joseph C. Aub delivered one of the special lectures in endocrinology at the Harvard Medical School, February 18, on the subject, "The Effects of the Internal Secretions on Calcium Metabolism."

Dr. Aub stated that the parathyroid glands exert a marked influence on the blood level and excretion of calcium. An increase in their activity causes an elevation of the blood calcium, a decrease in blood phosphorus and a high calcium excretion. Hypoactivity of these glands results in the reverse effects. Hyperparathyroidism causes the formation of giant cell tumors in bones and osteoporosis because of the mobilization of calcium from these structures. The high concentration of calcium salts in the urine leads to the deposition of calculi in the kidneys and to secondary severe renal damage.

Little is known of the factors influencing the absorption of calcium from the gastrointestinal tract. Viosterol has been shown to increase such absorption, but the role of the parathyroid glands is only poorly understood because low calcium diets are usually employed. Dr. Aub and Miss D. Tibbetts conducted a study of the calcium balance in several patients suffering from hyperparathyroidism, before and after operative treatment, in an effort to determine the effect of parathormone on calcium absorption. Their findings, made with high calcium intake, indicated that the parathyroids play a minor role in the control of calcium absorption.

There is evidence that there is a relation between the ovaries and the parathyroids in the control of calcium metabolism. Radiation sterilization in a case of hyperparathyroid disease produced a fall of blood calcium to normal levels and a change in the ratio of excretion by the kidneys and bowel.

Hyperactivity and hypoactivity of the thyroid gland also greatly influence the calcium balance of the body. In the former condition the calcium excretion is greatly elevated, the elevation being even greater than that observed in hyperparathyroid disease. This increase in excretion is evenly divided between the urine and feces, in contradistinction to that observed in hyperparathyroidism, in which the majority of the excess excretion is by way of the kidneys. In thyroid disease there is no disturbance of the total amounts of calcium and phosphorus in the blood stream or in the proportion of ionized and nonionized calcium. The bones in an occasional case of chronic severe hyperthyroidism show an extreme degree of decalcification. The explanation of these observations is not clear. The elevation of the basal metabolic rate cannot be the main factor, since there is no increase in calcium excretion or disturbance in its metabolism in other conditions in which the basal metabolic rate is increased, such as in leukemia and in fever. The rate of blood flow is greatly increased in hyperthyroidism, however, which may be responsible for some of the changes observed. The administration of thyroxine and the elevation of the basal metabolic rate in cases of tetany due to surgical removal of the parathyroids result in an elevation of the blood calcium and the alleviation of the symptoms of tetany. It must be concluded that the thyroid gland exerts some influence on the calcium metabolism apart from any influence it may exert on the parathyroids.

Investigations of the effect of the pituitary hormones on calcium metabolism are confusing because of the extremely variable results obtained by numerous investigators in working with different species of animals. In general, it appears that the administration of certain pituitary hormones causes a hyperplasia of the parathyroid glands with a secondary elevation of the blood calcium, while hypophysectomy causes atrophy of the parathyroids. There is practically no information available in the literature as to the effect of pituitary hormones on calcium excretion. The majority of cases of pituitary dyscrasia in human beings have been found to have normal blood calcium levels, although there are marked disturbances in calcium excretion.

Studies of calcium balance conducted with Dr. Walter Bauer in cases of acromegaly showed a marked increase in urinary excretion of calcium and a varying degree of osteoporosis. These findings were consistent, irrespective of the level of the basal metabolic rate, which was elevated in some cases and low in others. A similar marked elevation in urinary calcium excretion was observed in a patient suffering from pituitary basophilism. After radiation therapy of the pituitary and great clinical improvement, the calcium excretion returned to practically normal. The mechanism of the influence of the pituitary on calcium metabolism is not understood, although it has been suggested that it is mediated through the parathyroid glands, an explanation which is doubted by Dr. Aub.

In summary, the parathyroid glands exert an influence on the blood levels of calcium and phosphorus and on the rate of their excretion. The thyroid and pituitary glands do not affect the blood calcium, although they do cause marked variation in calcium excretion, the former increasing the output of calcium in both the urine and the feces, while the pituitary increases only the urinary excretion of calcium. The ovaries probably influence calcium metabolism.

NOTICES

ANNOUNCEMENT

FRANCIS J. MCNAMARA, M.D., announces the opening of his office at 478 Lebanon Street, Melrose. Telephone: Melrose 0341.

1937 GRADUATE FORTNIGHT OF THE NEW YORK ACADEMY OF MEDICINE

For the Annual Graduate Fortnight of The New York Academy of Medicine a subject of outstanding importance in the practice of medicine and surgery is selected and is presented from as many angles as possible. It offers to the profession a résumé of the present knowledge of the subject so that the practitioner may be so informed.

The Tenth Annual Graduate Fortnight will be held November 1 to 12 and will be devoted to a consideration of "Medical and Surgical Disorders of the Urinary Tract." The subject will include Bright's disease, arterial hypertension, and infections, tumors, calculi and obstructions of the urinary tract, and will exclude venereal disease, diseases of the genitalia and gynecology.

Twenty important hospitals of the city will present co-ordinated morning and afternoon clinics and clinical demonstrations. At the evening meetings prominent clinicians of New York and many of the other leading medical centers of this country who are recognized authorities in their special fields will discuss the several aspects of the general subject.

There will be a comprehensive exhibit of books, pathologic and research material, methods of diagnosis, treatment and prevention, and, whenever possible, clinical and laboratory diagnostic methods, x-rays, action of drugs and other therapeutic measures. Demonstrations will be held at regular intervals.

The medical profession is invited to attend.

A complete program and registration blank may be secured by addressing — Dr. Mahlon Ashford, The New York Academy of Medicine, 2 East 103d Street, New York City.

LAWRENCE CANCER CLINIC

The regular Lawrence Cancer Clinic, to be held at the Lawrence General Hospital, 1 Garden Street, Lawrence, on Tuesday, June 15, at 10:00 a. m., will be a demonstration and teaching clinic for physicians, with Channing C. Simmons, M.D., of Boston, associate in surgery in the graduate courses in medicine at the Harvard Medical School, surgeon-in-chief to the Collis P. Huntington Memorial Hospital, member of the Cancer Commission of Harvard University, and visiting surgeon to the Massachusetts General Hospital, present as consultant. Physicians of the north half of Essex County are invited to accompany any of their patients whom they desire to have this service or to send them with a note. A report will be returned to every physician who sends a patient. The service is gratis. Any physician is welcome to attend the clinic.

This clinic is endorsed by the Committee on Postgraduate Instruction of the Massachusetts Medical Society.

ROY V. BAKETEL, M.D.,
CHARLES J. BURGESS, M.D.,
JOHN J. MCARDLE, M.D.,
HARRY H. NEVERS, M.D.,
THOMAS V. UNIAC, M.D.,
J. FORREST BURNHAM, M.D., *Chairman.*

SOUTH END MEDICAL CLUB

The next regular meeting of the South End Medical Club will be held at the headquarters of the Boston Tuberculosis Association, 554 Columbus Avenue, Boston, on Tuesday, June 15, at 12 noon.

The speaker will be Herbert L. Lombard, M.D., Division of Adult Hygiene, Massachusetts Department of Public Health. His subject will be "Adult Hygiene."

All physicians are cordially invited to attend.

JOHN B. HALL, M.D., *Secretary.*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

CALENDAR OF BOSTON DISTRICT FOR THE WEEK BEGINNING MONDAY, JUNE 7

Tuesday, June 8—

9:30 a. m. Massachusetts General Hospital. Neuropsychiatric conference.

Wednesday, June 9—

8 a. m. Massachusetts General Hospital. Grand rounds, Orthopedic Department.

†12 m. Clinicopathological conference. Children's Hospital Amphitheater.

Thursday, June 10—

9 a. m. Massachusetts General Hospital. Surgical grand rounds.

9:15 a. m. Massachusetts General Hospital. Neurological conference.

12 m. Massachusetts General Hospital. Clinico-pathological conference.

Friday, June 11—

10 a. m. Massachusetts General Hospital. Fracture rounds.

12 m. Massachusetts General Hospital. Clinical meeting of the staff of the Children's Medical Service. Ether Dome.

Saturday, June 12—

*10 a. m. - 12 m. Staff rounds at the Peter Bent Brigham Hospital. Conducted by Dr. Henry A. Christian.

*Open to the medical profession.
†Open to Fellows of the Massachusetts Medical Society.

June 4—Medical Unit of the Reserve Officers. Page 957, issue of May 27.

June 7—American Medical Golfers Play in Atlantic City. Page 582, issue of April 1.

June 7 and 8—American Heart Association. Page 769, issue of April 29.

June 7-11—American Medical Association. Atlantic City. Page 709, issue of April 22.

June 8—The American Neisserian Medical Society. Page 489, issue of March 18.

June 8 and 9—American Board of Obstetrics and Gynecology. Page 78, issue of January 14.

June 11-18—Catholic Hospital Association. Page 488, issue of March 18.

June 15—Lawrence Cancer Clinic. Page 1000.

June 15—South End Medical Club. Page 1000.

June 24—Pentucket Association of Physicians. 8:30 p.m. at "Duck In."

July 6-11—Fifth International Congress of Hospitals. Page 37, issue of January 7.

September 13-17—Fifth International Congress of Radiology. Page 709, issue of April 22.

October 1-8—American Public Health Association meeting. New York City.

October 9—American Board of Ophthalmology, Chicago. Page 722, issue of April 22.

October 19, 20, 21—Academy of Physical Medicine. Page 723, issue of April 22.

October 25-29—American College of Surgeons. Chicago, Illinois.

November 1-12—1937 Graduate Fortnight of the New York Academy of Medicine. Page 1000.

BOOKS RECEIVED FOR REVIEW

The Morphine Habit and Its Painless Treatment. G. Laughton Scott. Second Edition. 105 pp. London: H. K. Lewis & Co., 1937.

L'Année Thérapeutique. Médications et Procédés Nouveaux. A. Ravina. 175 pp. Paris: Masson et Cie, 1937. 20 fr.

Transactions of the American Gynecological Society. Volume 61 for the year 1936. Edited by Otto H. Schwartz. 376 pp. St. Louis: C. V. Mosby Co., 1937.

Contributions to the Microscopic Anatomy of the Pancreas. Paul Langerhans. Reprint of the German original with an English translation and an introductory essay. H. Morrison. 39 pp. Baltimore: The Johns Hopkins Press, 1937. $1.00.

Why We Do It. An elementary discussion of human conduct and related physiology. Edward C. Mason. 177 pp. St. Louis: The C. V. Mosby Company, 1937. $1.50.

The Cardiac Glycosides. A series of three lectures delivered in the College of The Pharmaceutical Society of Great Britain under the auspices of the University of London. Arthur Stoll. 80 pp. London: The Pharmaceutical Press, 1937.

Personality and the Cultural Pattern. James S. Plant. 432 pp. New York: The Commonwealth Fund, 1937. $2.50.

Quelques Vérités Premières (Ou Soi-Disant Telles) en Pneumologie Clinique. Émile Sergent. 84 pp. Paris: Masson et Cie, 1937. 24 fr.

Quelques Vérités Premières (Ou Soi-Disant Telles) en Pathologie Cardio-Vasculaire. E. Donzelot. 82 pp. Paris: Masson et Cie, 1937. 24 fr.

Précis de Physiothérapie Clinique. Paul Duhem. 603 pp. Paris: Gauthier-Villars, 1937. 130 fr.

A Laboratory Manual of Physiological Chemistry. D. Wright Wilson. Third Edition. 288 pp. Baltimore: The Williams & Wilkins Company, 1937. $2.50.

BOOK REVIEWS

An Introduction to Comparative Biochemistry. Ernest Baldwin. 112 pp. New York: The Macmillan Company; Cambridge, England: The University Press. $1.50.

This small volume with the rather formidable title of "An Introduction to Comparative Biochemistry" should prove of interest to anyone with a modest knowledge of chemistry and biology who would like to know something about what problems confront biochemists today, and what has been revealed by the rather diffuse biochemical research of yesterday.

The subject matter has been chosen from those chemical researches which have made deductions possible regarding the evolution of higher from lower forms. Of particular interest is the author's clear and convincing presentation of the evidence regarding the emergence of vertebrates from fresh water forms.

The comparative biochemistry of nitrogen metabolism, of the purines, and of the nitrogenous bases is so simply presented and their significance in evolution so interestingly portrayed, that one forgets he is reading about one of the more complex applications of organic chemistry to biology.

The latter part of the book deals with the respiratory pigments and respiratory catalysts. This section, though not so satisfying in its completeness as the previous ones, is, nevertheless, stimulating because it brings the reader to the center of the biochemical research of today which is concerned with the mechanism whereby cellular oxidations are accomplished and controlled.

The author has facility of expression, interspersed occasionally with humor, which makes the book delightfully readable. He has also utilized a number of simple diagrams to illustrate the evidence which he presents to substantiate his generalizations. Although the book is not intended to be a critical or complete presentation of the subject, the author points out on occasion wherein the evidence is faulty and more work might well be done.

One gains the impression that Mr. Baldwin is not averse to regarding the biochemist as a chemical detective engaged in tracking down man's family

history. Certainly such a presentation gives point to much hitherto isolated research, which, on its face value, might otherwise seem of little consequence.

The book is introduced by a foreword by Sir Frederick Gowland Hopkins, with whose comment this reviewer concurs. He states, "He (the author) has illustrated very adequately in relatively few pages many of the main lines of current progress, leaving in the mind of the reader no doubts concerning their significance. I commend this book to undergraduates, and I also commend it to others whose interest may be great but their leisure small."

A short bibliography of papers, which would permit the reader to examine further certain subjects in which he became especially interested, is appended.

Les Courants de Haute Fréquence. Georges Ronneaux. 156 pp. Paris: Gauthier-Villars. 30 fr.

This brochure is concerned entirely with statements concerning the use of high frequency currents as applied to the treatment of various diseases, medical and surgical. It consists of 153 pages, including a descriptive index and a number of illustrations demonstrating technic. It introduces nothing that is new in this field, but in the main it is a digest of what has been done with high frequency currents up to the present time.

The volume should be helpful to the student and may well serve as a ready reference for the practitioner of limited experience in the use of electrical measures of treatment. It is written in French and is one of a series of eight volumes on electrotherapy by the publishers.

The Physiology and Pharmacology of the Pituitary Body. H. B. Van Dyke. 577 pp. Chicago: The University of Chicago Press. $4.50.

In this book Dr. Van Dyke has rendered a great service to both the investigator and the practicing physician. The volume is based on nearly 5,000 published reports, of which some 3,000 have been selected and their contents fitted into the complex mosaic that represents the groundwork of our knowledge of the anatomy, physiology and pharmacology of the pituitary body. The bibliography is unusually complete and contains nearly all the papers of value which appeared up to 1935. No other source contains such a wealth of well-chosen material on this interesting subdivision of endocrinology.

The book, which is written from the viewpoint of an experienced investigator, first takes up the anatomy and development of the different portions of the pituitary. It discusses the various hormones secreted by these structures and their relation to the other endocrine glands, as well as to growth, lactation, metabolism, kidney function, pigmentary changes and the reactions of smooth muscle. Of course, no monograph which summarizes the literature in such a complex field can be written in a way that makes for easy reading, but the subject is presented in a simple, straightforward fashion with careful references and a critical evaluation of the material selected. The work is well indexed, so that it constitutes an invaluable source of reference for the investigator and teacher, as well as for the physician or surgeon who is called upon to deal with the problems of endocrinology.

Essentials of Electrocardiography. For the Student and Practitioner of Medicine. Richard Ashman and Edgar Hull. 212 pp. New York: The Macmillan Company, 1937. $3.50.

The authors have covered the field of practical electrocardiography giving a grounding in this laboratory procedure for those not intending to specialize in cardiology. They very properly stress the use of the electrocardiogram in estimating myocardial change rather than its use in disorders of the rhythm, since in the latter an accurate diagnosis can usually be made without the help of this method of study. They point out that a complete diagnosis can never be made by electrocardiograms alone, and that it is to be used as a rule in confirmation of the clinical diagnosis and in conjunction with other laboratory procedures.

A simple, well-balanced account of the field of electrocardiography adequately illustrating the various pathological tracings does not alone justify the publication of another text. The chief value of this book is the statistical study of the normal electrocardiogram and the inclusion, in an appendix, of normal limits of duration and amplitude, together with other variations within normal limits. While the details of the study are not given, it is evident that various normal series of from 25 to 200 have been used in reaching their conclusions. This is a very valuable contribution to the fuller study of the normal electrocardiogram, which at last is engaging the attention of workers.

Researches Published from the Wards and Laboratories of the London Hospital During 1936. London: H. K. Lewis & Co. 7s 6d.

This is a collection of reprints, issued annually by the London Hospital. Outstanding are studies on exophthalmos and thyrotoxicosis by W. Russell Brain; a report on the treatment of carcinoma of the cervix uteri by the Stockholm (radium) technic, with sixteen five-year cures out of sixty-seven cases, by Alan Brews; Hugh Cairns's follow-up of one hundred and thirty-five patients operated upon for brain tumor in Harvey Cushing's clinic in 1926-27, with sixty-three still living seven to nine years after operation; "Pulmonary Congestion Following Artificial Pneumothorax" by Ronald V. Christie; John Parkinson's Lumleian lecture on "Enlargement of the Heart"; and "Leuco-Erythroblastic Anaemia" by Janet M. Vaughan. The volume reflects the activity of both the laboratory and clinical branches of this great hospital.